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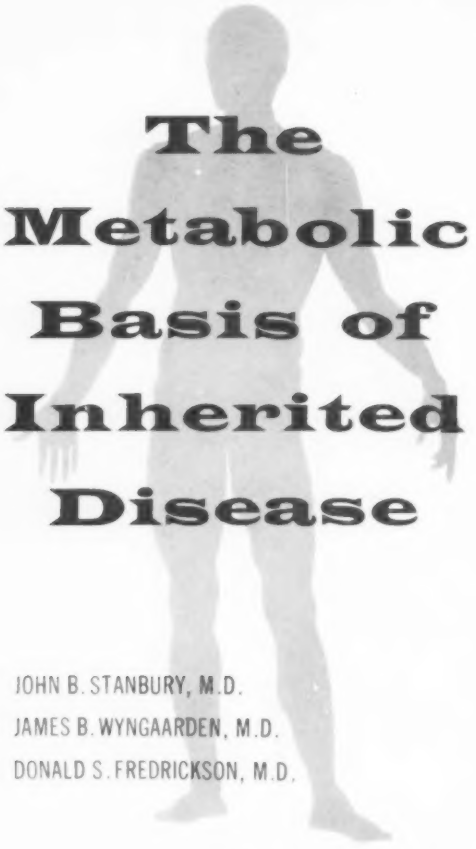

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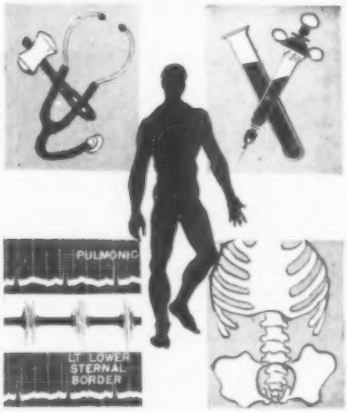

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The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education; this includes preparation for medical education; the medical school experience; intern and resident education; graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

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Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

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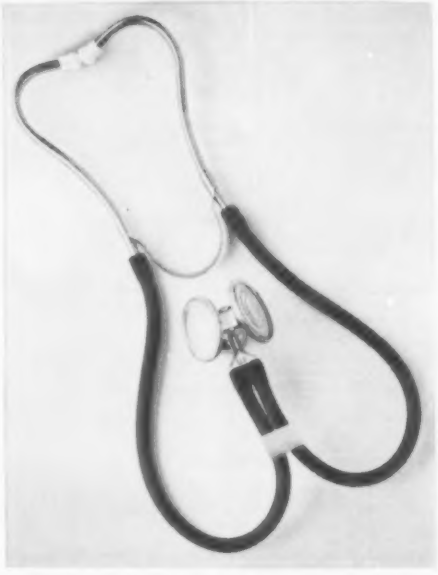

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1961

NOVEMBER

AMERICAN COLLEGE OF CHEST PHYSICIANS, Interim Session, Brown-Palace Hotel, Denver, Nov. 25-27. Mr. Ward Bentley, 112 E. Chestnut St., Chicago 11, Executive Assistant.

AMERICAN MEDICAL ASSOCIATION, CLINICAL MEETING, Denver, Nov. 27-30. Dr F. J. L. Blasingame, 535 N. Dearborn, Chicago 10, Executive Vice-President.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, Somerset Inn, Shaker Heights (Cleveland), Ohio, Nov. 30-Dec. 2. Dr. Jessie Laird Brodie, 1790 Broadway, New York 19, Executive Director.

AMERICAN PUBLIC HEALTH ASSOCIATION, Cobo Hall, Detroit, Nov. 13-17. Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, Executive Director.

CONFERENCE ON GRADUATE MEDICAL EDUCATION, Nov. 30-Dec. 1. Dr. Paul Nemir, Jr., Dean, Graduate School of Medicine, University of Pennsylvania, Philadelphia 4.

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA, Cleveland Auditorium, Cleveland, Nov. 13-16. Mr. Roy T. Ragatz, Box 1109, Madison 1, Wis., Executive Director.

DECEMBER

AMERICAN ACADEMY OF DERMATOLOGY AND SYPHILOLOGY, Palmer House, Chicago, Dec. 2-7. Dr. Robert R. Kierland, Mayo Clinic, Rochester, Minn., Secretary-Treasurer.

1962

JANUARY

AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS, Palmer House, Chicago, Jan. 27-Feb. 1. Mr. John K. Hart, 29 East Madison St., Room 910, Chicago 2, Executive Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING FOR SURGEONS AND GRADUATE NURSES, Statler-Hilton and Biltmore Hotels, Los Angeles, Jan. 29-Feb. 1. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

FEBRUARY

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AMERICAN COLLEGE OF RADIOLOGY, Roosevelt Hotel, New York City, Feb. 7-10. Mr. William C. Stronach, 20 N. Wacker Dr., Chicago 6, Executive Director.

CONGRESS ON MEDICAL EDUCATION AND LICENSURE, Palmer House, Chicago, Feb. 3-6. Dr. Walter S. Wiggins, 535 N. Dearborn St., Chicago 10, Director, AMA Council on Medical Education and Hospitals.

SOCIETY OF UNIVERSITY SURGEONS, Cleveland, Ohio, Feb. 8-10. Dr. C. Frederick Kittle, University of Kansas Medical Center, Kansas City 12, Kansas.

MARCH

AMERICAN ASSOCIATION OF ANATOMISTS, Minneapolis, March 20-23. Dr. Louis B. Flexner, University of Pennsylvania School of Medicine, Dept. of Anatomy, Philadelphia 4, Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Sheraton-Cadillac Hotel, Detroit, March 5-7. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Hotel Peabody, Memphis, Tenn., March 26-28. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

AMERICAN DERMATOLOGICAL ASSOCIATION, INC., (members only) San Marcos Hotel, Chandler, Arizona, March 28-31. Dr. Wiley M. Sams, 308 Ingraham Building, Miami 32, Fla., Secretary.

APRIL

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AMERICAN ACADEMY OF GENERAL PRACTICE, Las Vegas, Nev., Apr. 6-13. Mr. Mac F. Cahal, Volker Blvd., at Brookside, Kansas City 12, Mo., Executive Director.

AMERICAN ACADEMY OF NEUROLOGY, Statler-Hilton Hotel, New York City, April 23-28. Mr. Thomas D. Swedien, 4307 E. 50th St., Minneapolis 17, Executive Secretary.

AMERICAN ACADEMY OF PEDIATRICS, spring meeting, Statler-Hilton, New York City, Apr. 30-May. Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Executive Director.

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AMERICAN COLLEGE OF ALLERGISTS GRADUATE INSTRUCTIONAL COURSE AND EIGHTEENTH ANNUAL CONGRESS, April 1-6, 1962, Hotel Radisson, Minneapolis, Minnesota. For further information, write to: John D. Gillaspie, M.D., Treasurer, 2141 14th Street, Boulder, Colorado.

AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS, Palmer House, Chicago, Apr. 2-5. Mr. Donald F. Richardson, 79 W. Monroe St., Chicago 3, Executive Secretary.

AMERICAN COLLEGE OF PHYSICIANS, Bellevue-Stratford Hotel, Philadelphia, April 9-13. Dr. Edward C. Rosenow, Jr., 4200 Pine St., Philadelphia 4, Executive Director.

AMERICAN COLLEGE OF SURGEONS, SECTIONAL MEETING, Sheraton-Park Hotel, Washington, D.C., April 16-18. Dr. William E. Adams, 40 E. Erie St., Chicago 11, Secretary.

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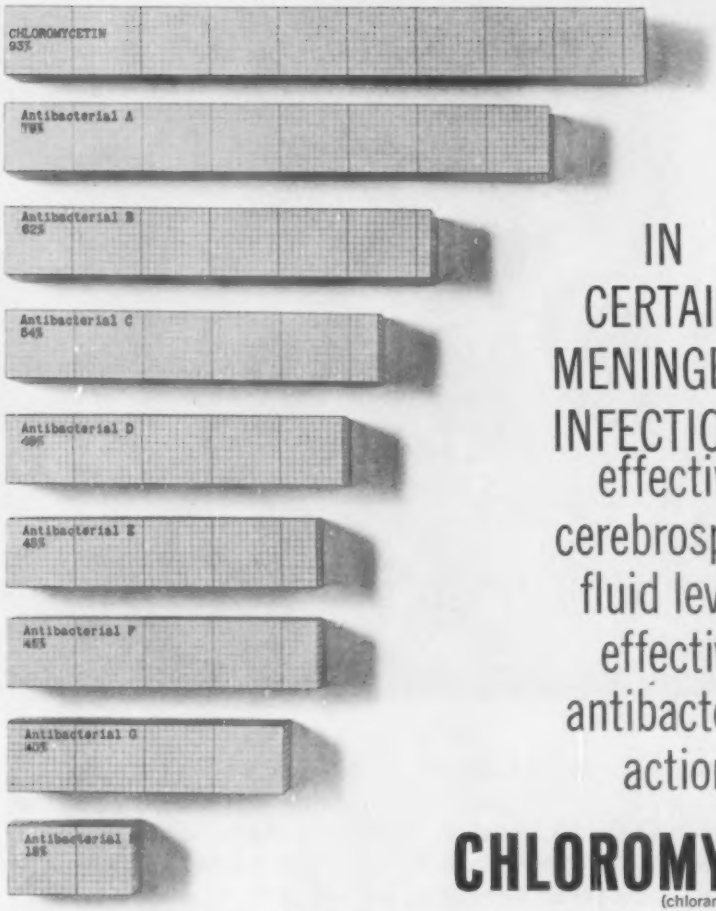

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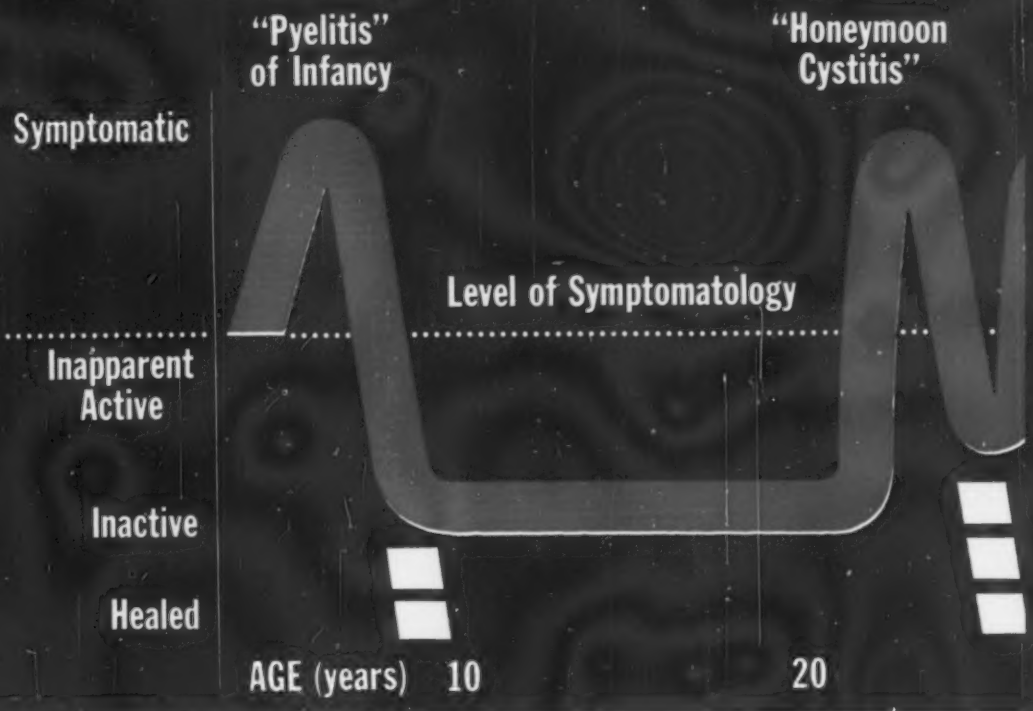

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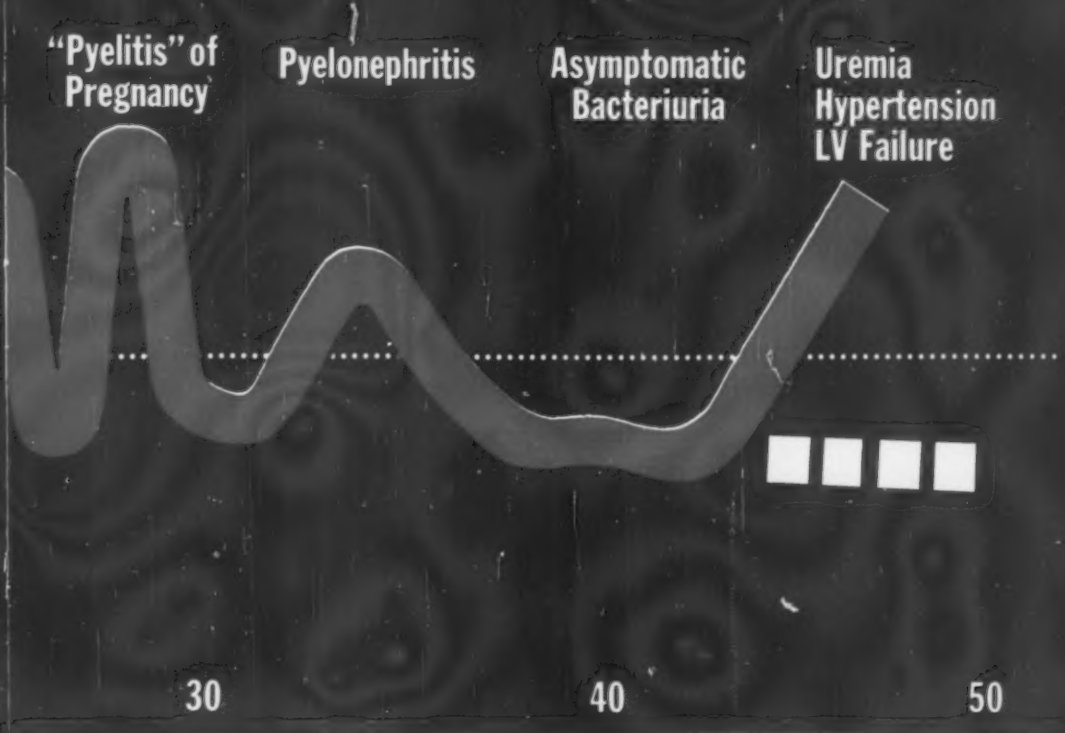

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1. Birchall, R.: Am. Practit. *11*:918, 1960. 2. Sanjurjo, L. A.: Med. Clin. N. Amer. *43*:1601, 1959.

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Lymphosarcoma	21	15	0	0	3	3
Multiple Myeloma	16	9	0	0	4	3
Reticulum Cell Disease	8	0	0	1	7	0
Leukemia	23	10	0	0	8	5
Chronic Lymphatic Leukemia	8	4	0	0	3	1
Acute Monoblastic Leukemia	11	5	0	0	3	3
Acute Myeloblastic Leukemia	4	1	0	0	2	1
Carcinoma (Breast, Lung, and Solid Tumors)	29	2	1	1	23	2
Miscellaneous (Mycosis, Fungoides, Psoriasis)	4	0	0	1	3	0
Total	130	46	4	7	57	16

Adapted from Wall, R. L., and Conrad, F. G.

Note that the neoplastic disorders most responsive to Cytoxan were lymphosarcoma, multiple myeloma, Hodgkin's disease, and chronic lymphatic leukemia. Occasionally, good results were observed in acute monocytic leukemia and carcinoma of the breast.

Other advantages noted in this study*

• multiple routes of administration, permitting prolonged maintenance therapy • lack of latency period for bone marrow depression • failure to produce significant thrombocytopenia • potential therapeutic effect in diseases usually unresponsive to other mustard compounds (*e.g.*, myeloma).

*Wall, R. L., and Conrad, F. G.: Arch. Int. Med. *108*:456-482, 1961.

INDICATIONS: Cytoxan is valuable for palliative therapy of certain malignant neoplasms, particularly some of those arising in the reticuloendothelial and hematopoietic systems and certain solid tumors.

Types of cancer which have proved relatively more susceptible or more resistant to Cytoxan therapy may be grouped as follows:

Group I: Neoplasms relatively susceptible to Cytoxan
- Hodgkin's disease
- Lymphomas: lymphosarcoma; giant follicular lymphoma; reticulum cell sarcoma
- Leukemia: acute; chronic
- Mycosis fungoides

Group II: Neoplasms relatively resistant to Cytoxan
- Malignant neoplasms of the breast and the ovary*
- Malignant neoplasms of the lung, the gastrointestinal tract and the genitourinary system, including the cervix and the uterus
- Malignant neoplasms of miscellaneous origin
- Malignant melanomas

*Malignant tumors of these organs are somewhat more susceptible to Cytoxan therapy than are the others included in this group.

DOSAGE: *For neoplasms relatively susceptible to Cytoxan* – Patients with lymphomas and other neoplasms believed to be relatively susceptible to Cytoxan therapy are given an initial dose of 2 to 3 mg./Kg./day intravenously. White blood counts and platelet determinations should be made daily or twice weekly and the dosage adjusted accordingly. Intravenous infusions should be continued for at least 6 days unless otherwise indicated. A leukopenia of between 1500 and 5000 cells per cu. mm. (or lower) may be expected between the tenth and fourteenth day. In the presence of a leukopenia of less than 2000/cu. mm. Cytoxan should be discontinued until the white cell count returns to 2000 to 5000 (usually within a week). Dosage is subsequently adjusted as indicated by the patient's objective response and the leukocyte count. If the patient is subjectively improved, if the size of the tumor has decreased, or if the white cells are satisfactorily maintained between 2000 and 5000/cu. mm. oral dosage may be instituted equivalent to intravenous dosage.

Thrombocytopenia is rarely observed on this regimen. If platelet counts of less than 100,000/cu. mm. are observed, the patient should be watched carefully. If platelets continue to decrease, Cytoxan should be discontinued.

The patient who has had previous treatment with alkylating agents, or x-ray, or is debilitated may be more susceptible to bone marrow depression, and initial Cytoxan doses should be more conservative than the above. Such patients should have more frequent hematologic evaluation. Good medical practice demands access to a reliable hematologic laboratory when using Cytoxan.

For neoplasms relatively resistant to Cytoxan – Patients with carcinomas and other malignant neoplasms believed to be less susceptible to Cytoxan therapy are given a dose of 4 to 8 mg./Kg./day intravenously. Unless there are indications to the contrary, this dose is continued for 6 days, then stopped. Leukopenia usually ensues on the tenth to fourteenth day after the first dose of Cytoxan. Thrombocyte reduction is not common, and platelets may actually increase. The leukocyte count promptly returns toward normal levels in most cases, and as it begins to increase, sufficient Cytoxan is administered to maintain it near 2000 to 5000/cu. mm. This may be accomplished by two intravenous injections weekly, or by oral administration, or by a combination of both routes. An oral dosage of 50 to 200 mg. daily or an intravenous injection of 5 mg./Kg. twice weekly will usually suffice.

The platelet and leukocyte counts should be followed carefully, and the prior treatment history of patients carefully evaluated as delineated above.

Leukopenia as a guide to adequacy of dosage – The best objective measure for dosage seems to be the number of circulating white blood cells. This is used as an index of the activity of the hematopoietic system, especially the bone marrow. The mechanism by which Cytoxan causes a reduction in the level of white blood cells is not known, but cessation of dosage results in an increase in the level, indicating that the hematopoietic system had not been permanently affected. When large doses (8 mg./Kg./day for 6 days) are given initially, the white cell count falls rapidly. Following the cessation of the 6-day course, the white cells may continue to decline for as long as 8 days and then increase. The reduction of the white cell count during Cytoxan therapy and its subsequent increase when therapy is discontinued can be repeated in the same patient. Maximal reduction in leukocyte count indicates the maximal permissible Cytoxan level for therapeutic effect. Leukopenic patients must be watched carefully for evidence of infection.

Total white blood cell and thrombocyte counts should be obtained 2 or more times weekly in order to evaluate therapy and to adjust dosage.

SIDE EFFECTS: Although Cytoxan is related to nitrogen mustard, it has no vesicant effect on tissue. It does not traumatize the vein when injected intravenously, nor does it cause any localized tissue reaction following extravasation. It may be administered intravenously, intramuscularly, intraperitoneally, intrapleurally or directly into the tumor, when indicated. It is apparently active by each of these routes.

Nausea and vomiting are common and depend on dose and on individual susceptibility. However, many investigators accept the nausea and vomiting in favor of maintaining maximal therapy. The vomiting can be controlled with antiemetic agents

Alopecia is a frequent side reaction to Cytoxan therapy. It has been observed in 28% of the patients studied in this country. The incidence is greater with larger doses. The loss of hair may first be noted about the 21st day of therapy and may proceed to alopecia totalis. This effect is reversed following discontinuance of Cytoxan; during reduced maintenance therapy, hair may reappear. It is essential to advise the patient in advance concerning this effect of the drug.

Dizziness of short duration and of minor degree has occasionally been reported.

Leukopenia is an expected effect and can be used as a guide to therapy. Thrombocytopenia may occur, especially after large doses. The leukocyte or platelet counts of an occasional patient may fall precipitously after even small doses of Cytoxan, as with all alkylating agents. The drug should be discontinued in such patients and reinstituted later at lower dosage after satisfactory hematologic recovery has occurred. Prior treatment with x-ray or with other chemotherapeutic agents frequently causes an earlier or exaggerated leukopenia or thrombocytopenia after Cytoxan medication. Only rarely has there been a report of erythrocyte or hemoglobin reduction.

ADMINISTRATION: Add 5 cc. sterile water (Water for Injection, U.S.P.) to 100 mg. of Cytoxan in the sterile vial (add 10 cc. to 200 mg. vial). Shake, allow to stand until clear, remove with sterile syringe and needle and inject.

The freshly prepared solution of Cytoxan may be administered intravenously, intramuscularly, intraperitoneally, intrapleurally, or directly into the tumor. The solution should be administered promptly after being made but is satisfactory for use for three hours after preparation.

If the patient is receiving a parenteral infusion, the Cytoxan solution may be injected into the rubber tubing if the solution is glucose or saline.

No thrombosis or thrombophlebitis has been reported from injections of Cytoxan. Extravasation of the drug into the subcutaneous tissues does not result in local reactions.

PRECAUTIONS: Cytoxan should not be given to any person with a severe leukopenia, thrombocytopenia, or bone marrow infiltrated with malignant cells. It may be given with suitable precautions to patients who have had recent x-ray treatment, recent treatment with a cytotoxic agent, a surgical procedure within 2 to 3 weeks, or debilitated patients.

AVAILABILITY: Cytoxan is available as follows:

Cytoxan for Injection, 100 mg., a sterile dry-filled vial containing 100 mg. cyclophosphamide and 45 mg. sodium chloride. Packaged, 12 vials per carton.

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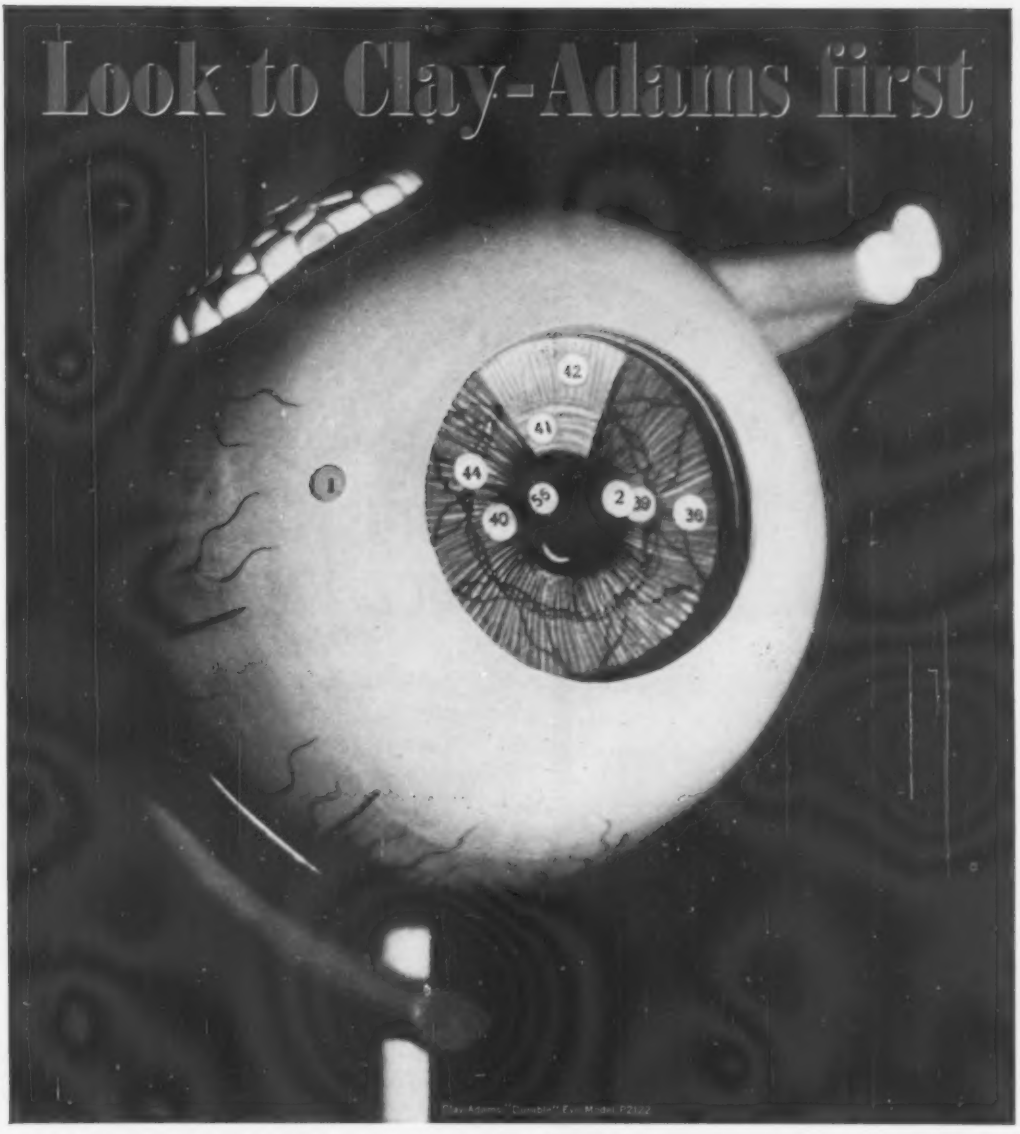

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1. J. Lab. & Clin. Med., 45:679, 1955. 2. J.A.M.A., 173:333, 1960.
3. New England J. Med., 263:1058, 1960.

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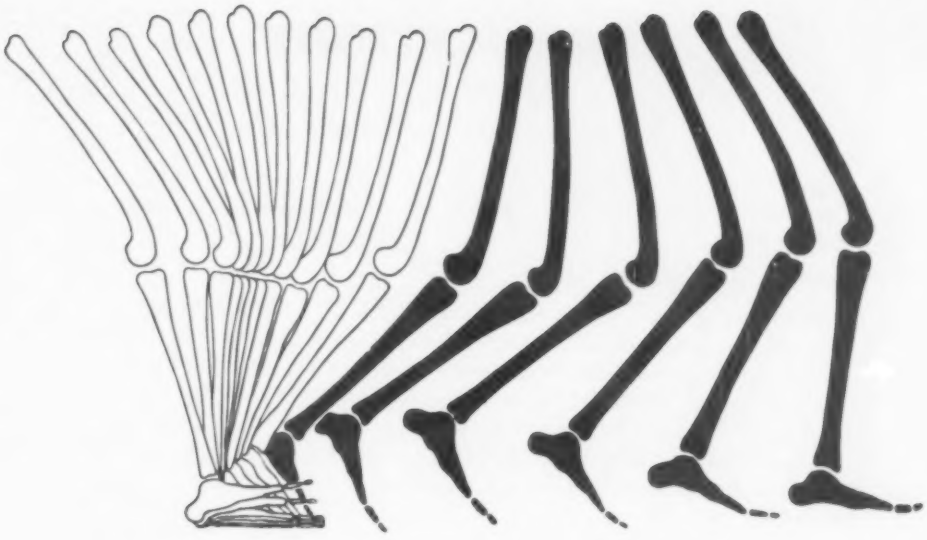

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For injection into the tendon sheath, 4 to 30 mg. is a usual range (in recurrent or chronic conditions, repeat injections may be needed).

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1. Norcross, B. M., and Winter, J. A.: Methylprednisolone acetate: a single preparation suitable for both intra-articular and systemic use, New York J. Med. *61*:552 (Feb. 15) 1961.

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PUBLICATIONS OF RELATED ORGANIZATIONS

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Results of the Matching Program 1961 (NIMP publication).
The Student and the Matching Program 1962 (NIMP publication).
Medical College Admission Test—Bulletin of Information 1961 (Psychological Corporation).

In addition to the above publications, the American Psychiatric Association, 1700 Eighteenth St., N.W., Washington, D.C., still has available copies of the two Institutes on the teaching of psychiatry: Psychiatry in Medical Education—1951 Conference ($1.00) and the Psychiatrist: His Teaching and Development—1952 Conference ($2.50).

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The Journal of MEDICAL EDUCATION

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*Wenckert, A., and Robertson, B.: Acta chir. scandinav. 120:79, 1960.

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A Study of Religious Beliefs and Attitudes of Senior Medical Students

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This is a study dealing with the religious beliefs, concerns, and attitudes of medical students. Seniors were chosen for the study because, of all the students, they represented the student group with the greatest exposure to a medical environment.

The major purpose of the study was directed toward discovering what these students believed and how they felt their religious faith would influence and enter into their practice of medicine.

Religion and medicine have been handmaidens of man since the beginning of time. Often the same individual has been both priest and medicine man. In later centuries when the doctor abandoned his mystical medical communion with supernatural spirits and became a layman, he was still considered an individual set apart. He had to be a good, pious, self-sacrificing person. The idealized character and way of life which were demanded by the patient of his doctor constitute a major factor in the ethical tradition of the medical profession as we have known it through the centuries. The patient has always demanded, and still does so, a single-minded, almost monastic and priestly devotion to the ministry of healing.

* Associate Professor of Psychiatry and of Preventive Medicine.

Thus it seems in order to take a look at the belief systems of a group of today's neophyte physicians and subject these beliefs, through the group's help, to searching scrutiny.

Since a student's background and what he brings to medical school, ideologically speaking, is so important in any analysis, a few significant facts are given. The students in this group represent a relatively good cross-section of college students. Forty-six per cent graduated from church-related colleges; 43 per cent from state or municipal colleges; and 11 per cent from private, nonsectarian schools. As for geographical origins, 46 per cent came from Texas. The remaining 54 per cent came from twenty widely scattered states and four foreign countries.

Recently, an interesting study was published which had been undertaken to discover the views and values of a broad mass of college students. This included on-the-spot observation of the programs at some 30 institutions and the gathering of a substantial body of evaluative data on courses and curricula at these and other colleges and universities. The institutions varied greatly in size, location, administration, and objectives. The findings about religion were summarized: "Students normally express a

need for religion as a part of their lives and make time on most weekends for an hour in church. But there is a 'ghostly quality' about the beliefs and practices of many of them, to a sensitive observer. Their religion does not carry over to guide and govern important decisions in the secular world. Students expect these to be socially determined. God has little to do with the behavior of men in society, if widespread student judgment be accepted. His place is in church and perhaps in the home, not in business or clubs, or community. He is worshiped, dutifully and with propriety, but the campus is not permeated by a live sense of His presence."[1] The author then goes on to say that these values are not the unanimous choice of the American college student. The available data indicate that the profile just given may apply to 75 per cent or 80 per cent of them. The results of this study are reported in an effort to show what their (our students) college generation throughout the country felt about religion during their undergraduate days.

The following questionnaire was given to 67 members[2] of the 1959 senior class of Baylor University College of Medicine:

I. Describe briefly or at length your religious beliefs.

II. What religious questions or problems have caused you the greatest concern or confusion?

III. Do you consider yourself more religious, less religious, or the same as when you entered medical school?

IV. Did you enter medical school with religious conflicts? If so, what has happened?

V. Has medical school created, intensified, or lessened for you any religious conflicts? Describe.

VI. Have other faiths and denominations created for you conflicts in your relationships, work, thinking, etc.?

VII. Have religious groups differing from yours been a divisive factor in your social relationships to the point of causing pain or unhappiness?

VIII. What part does your religious faith play in your life now or you expect will play in your life as a practicing physician?

IX. Do you think that religion and psychiatry are allies, rivals, or enemies? Describe.

X. Do you think religious faith causes, prevents, or plays any part in mental conflicts and disorders?

XI. What part do you think a patient's religious faith has in healing and recovery from physical or emotional illness?

The first fifteen students to answer the questionnaire felt that several of the questions should be extended to include additional information.[3] As a result, the following questions were added to the original questionnaire:

XII. On what, in your judgment, are religious beliefs based?

XIII. On what do you base (or how did you arrive at) your beliefs?

XIV. Did your undergraduate college training affect your religious beliefs? And if so, how?

[1] P. E. Jacob, *Changing Values in College. An Exploratory Study of the Impact of College Teaching*, p. 2. New York: Harper and Brothers Publishers, 1957.

[2] The questionnaire was given on a voluntary basis to the members of the senior class. All participated except five. These five did not have any basic objection to the project but were extremely busy with their studies at the time the questionnaire was given. They were interviewed, and their ideas were essentially the same as their classmates. Thus, philosophically, they represent no deviation.

[3] These students were asked what should be added to the questionnaire, and their suggestions were discussed with them as a group. Out of this discussion came the eight additional questions.

XV. Do you think there is a conflict between religion and science?

XVI. It has been said that members of some religious groups are more prone to develop mental disorders. Comment.

XVII. Does the physician have a special role in relation to religion?

XVIII. What, in your judgment, are the major problems of religion in general?

XIX. Did you enjoy answering these questions? Why? If not, what emotion was provoked by this questionnaire?

The revised questionnaire was then given to the remaining 53 students of the senior class. Table 1 shows the religious affiliations of the students. Group A gives the number in each faith and denomination for the 67 students who answered the original questionnaire. Group B shows the number in each faith and denomination for the 53 students who answered the additional questions as well.

Students' answers to the questions have been grouped into the following interpretive categories:

A. Basis of Religious Beliefs (XII, XIII, XIV)

B. Denominational Attitudes (to all the questions given)

TABLE 1

STUDENT RELIGIOUS AFFILIATIONS

Denomination	Group A	Group B
Methodist	16	13
Baptist	14	11
Presbyterian	11	10
Jewish	7	6
Catholic	4	2
Episcopalian	3	2
Church of Christ	2	2
Protestant (Denomination unspecified)	2	2
Lutheran	1	0
Agnostic	3	2
Christian and Missionary Alliance	1	0
Unitarian	1	1
Not given or unknown	2	2
Total:	67	53

C. Religious Commitments and Medical Practice (VIII, XVII)

D. The Influence of Medical School on Religious Beliefs and Conflicts (II to VI)

E. Interrelationships of Psychiatry and Religion (IX, X)

F. Relation of Religion to Illness (XI, XVI)

G. Students' Response to Questionnaire (XIX)

In general, a correlative grouping of answers has been followed. In certain instances individual student answers are quoted to illustrate better a point made either by the student or by a group.

A. Basis of religious beliefs.—When asked what they thought was the basis of religious beliefs in general, half of the students felt that these were based on man's need to explain what he does not understand, to explain his fears and questions about death. The other half felt that religious beliefs were based on teachings, knowledge, faith, and/or personal experience. Most of the Baptists and Catholics added that the Bible was the inspired word of God and thus the basis of religious beliefs. Answers ranged from those of a student who stated that "the Christian beliefs are set down in the Holy Scriptures, are a complete revelation of God, and as such are made available to anyone who truly desires to know them," to the other extreme of a student who felt that beliefs were based on "myth, faith, and indoctrination." An interesting and fairly typical comment made by one student was that "most people are born into a religion and change little thereafter. It is distressing that in spite of the important role that religion has played throughout human history, only a few people endeavor to search their own conscience and examine their beliefs intellectually."

Eighty-five per cent of the students claimed to have the same religious beliefs as their parents. Only 15 per cent had beliefs that totally differed from parental belief. However, most of the students stated that, whereas they had essentially adopted the beliefs of their parents, these beliefs had been polished and strengthened by their own thoughts, subsequent studies, and personal experiences in religion. Some even claimed a complete intellectual independence of parental beliefs. Students who felt that their religious beliefs were completely different from those of their parents differed in the direction of agnosticism. There were no students who were staunch followers of a faith totally different from that of either of their parents. For the group of students questioned, parental beliefs thus became an important influence in their later lives, although most of the students had done much of their own thinking in the development of these beliefs.

Undergraduate college training affected the religious beliefs of 35 per cent to make them more religious and of 30 per cent to make them less religious, disillusioned, or skeptical. Only 22 per cent said that college had had no effect on their beliefs. The more general change seemed to be that patterns and teachings which had been handed to them as youngsters were scrapped or modified to form stronger beliefs than before. Emphasis changed from blind obedience to reasoning acceptance of religious tenets. One student objected to church schools by stating that students there are exposed to "the more evangelistic methods of Christianity, which are characterized by illogical emotions, shallow evaluations of the Bible, and superficial piety."

B. Denominational attitudes.—An attempt was made to correlate answers with the denomination to which the students belonged. Denominational groups were then compared with one another to find what trends were present. (It should be kept in mind that the population studied is a small one including fourteen Baptists, sixteen Methodists, eleven Presbyterians, seven of the Jewish faith, and four Catholics.)

The most striking fact was the strong correlation between answers given to all the questions by Baptists and Catholics. On several questions, Baptists and Catholics were in unanimous agreement, giving similar answers. In the remainder of the questionnaire, Baptists and Catholics agreed to a very large extent although not unanimously. There was no question provided in this questionnaire on which Baptists and Catholics disagreed as denominational groups. To a similar but less unanimous extent, the Methodists and Presbyterians aligned themselves and gave similar answers to the questions. Furthermore, in virtually every instance, the Methodists and Presbyterians as a group gave differing and sometimes opposite answers to the Baptists and Catholics as a group. Jewish students showed less group unity in their answers, aligning themselves sometimes with the Methodists and Presbyterians, and sometimes with the Baptists and Catholics.

Baptists and Catholics unanimously felt that their religious faith would play an important part in their own lives as practicing physicians, whereas only half of the Methodists and Presbyterians felt this. Conversely, a large majority of Methodists and Presbyterians felt that the faith of their patients would be a positive force in healing and recovery from physical and emotional illness, whereas only half of the Baptists and Catholics felt that way. Thus, the patient's faith seemed more important to the Methodists and Presbyterians, whereas the Baptists and Catholics

tended to feel that their own faith was more important.

Generally speaking, the Baptists and Catholics appeared to have entered medical school with their religious beliefs already firmly fixed. The majority stated that medical school had not altered their religious beliefs, that they had had no religious conflict when they entered medical school, and that medical school had played no part in the development of any religious conflict. Furthermore, they unanimously stated that other faiths and denominations had created for them no conflict in interpersonal relationships. Most of the Methodists and Presbyterians felt that their medical training had made them more religious than before, and some of them had experienced conflicts of a religious nature as a result of medical education. A greater number of Methodists and Presbyterians also stated that they had had conflicts in relationships with other faiths or denominations.

A majority of the Baptists and Catholics mentioned the Bible as the inspired word of God and the basis of religious beliefs, but only a small minority of the Methodists and Presbyterians and Jews did so. Only in two major categories did the major Christian groups align themselves similarly, and in both cases they differed from the Jewish students. Most of the Christians felt that there was no conflict between religion and science whereas the Jews were divided, with half feeling that there was no conflict and half feeling that there was. Also, most of the Jews felt that the physician had no special role in relation to religion, whereas most of the Christians felt that the physician had a special role.

C. Religious commitment and medical practice.—Sixty per cent of the students sampled in this study expressed a strong personal commitment to a religious faith and felt that their religious faith would play an important part in their life as practicing physicians. This is in distinct contrast to the results of the previously cited study among undergraduate college students, where 75–80 per cent felt that their religion did not carry over to guide and govern important decisions in the secular world. Several possibilities come to mind to explain this striking difference in the two groups. From a study of the answers, 50 per cent of the students in the medical school series reported that medical training had made their religious beliefs more positive. Most of the remainder stated that medical school had had no effect on their religious beliefs, but some added that medical school had given them greater religious understanding, even though it did not affect their own beliefs. Only five students felt that their medical training had made them less religious. Thus, it would appear that medical education itself was predominantly a positive force in producing the difference in the two groups. Another possibility is that this particular group (the medical students) represented a biased population in the matter of personal commitment to religion. A third and less likely possibility is that medical students in general are more likely to have personal commitments and deep religious faith than other students.

In a somewhat related manner, an even greater number of the students felt that the physician had a special role in relation to religion. Many felt that this role stemmed from the fact that the physician should treat the whole patient and therefore should know about his religion. An equal number felt that the role was stronger than this and that the physician and the clergyman should work closely together, for they both deal with problems of life and death. In all, 75 per cent felt that the physician had a

special religious role, though they differed as to the specific nature and extent of the role.

D. The influence of medical school on religious beliefs and conflicts.—Only 5 per cent of those interviewed stated that religious problems had caused them no concern. The others mentioned some concern or confusion about religious matters. However, no large group of students consistently listed similar questions or problems, and the variety of answers was great. For the most part, answers showing the greatest amount of intellectual reasoning were given by students who had rebelled in one way or another against the faith of their childhood. For a small number, religion had at some time been an all-consuming problem.

Most of the students had experienced and resolved their conflicts prior to entering medical school; few had religious conflicts in medical school. Many students stressed problems of a very basic nature, such as: "Does God exist? If He does, do I have the correct concept of Him and of my responsibility to Him?" "Was man created in God's image or was God created in man's image?" "Is one religion more valid than others?" "How can one integrate the scientific and Biblical theories concerning the genesis of man?" Several students felt a conflict between their beliefs and their instinctual desires, between their attempts to follow their religious principles and at the same time lead a normal life. This group spoke out against what they thought was the hypocrisy of the church as a whole. Several mentioned the question of how a good and righteous God can permit so much suffering, injustice, and unhappiness in the world. Several expressed concern over the intolerances in various religions and denominations. One derided the insistence of some groups that salvation is not possible without embracing their religion.

Though religious conflicts were largely resolved prior to entering medical school, about half of the students considered themselves more religious as a result of their medical education. The lessening of conflicts did not stop their growth and development in the religious field. Many students felt that they had benefited from medical education by achieving a greater understanding of life and death and of the role played by religion in helping man adjust to thoughts of death. Others said that their medical training had made them realize that something as complicated as the human body could not have happened accidently; that there had to be a divine creator. Very few students strengthened their beliefs in a denominational sense or were better church-goers as a result of medical school, but medical school did create in many a feeling of being closer to their religion and to ultimate things.

E. Interrelationships of psychiatry and religion.—A large majority of the students felt that psychiatry and religion were related in a variety of ways. As one student summed it up, "if the purpose of religion and psychiatry is to provide one with equanimity of mind, then the two are allies. If one feels that psychiatry is another kind of religion, the two become rivals." Only seven students saw absolutely no relationship between psychiatry and religion. A critical area of difference between the two that was repeatedly pointed out was that psychiatry does not pass moral judgments, whereas religion does. Some students ignored this difference and contended that because psychiatry and religion dealt with many of the same aspects of life they could be considered as allies. Others stated that *both* were essential for stability and well being. Still others emphasized that psychiatry and religion

were rivals rather than allies, since both seek to achieve the same ends by totally different means.

All the students questioned felt that religious faith played some part in mental conflicts and disorders. There was general agreement that the role played by religion in the development of mental disorders was an extremely variable one, and that a person's religion could be the cause of a mental disorder, a symptom or precipitating factor, or could be the only thing that prevents a person from developing a mental disorder. One student stated strongly that "anyone who is truly religious does not develop neuroses," whereas another student felt that "religion is the main cause of mental conflicts and disorders." The exact role played by a patient's religion was thought to depend on the soundness of the principles upon which that religion was based. If his religion created too many conflicts in his relationship to society it was likely to be a precipitating factor. If, however, his religion was compatible with his ideals and standards in relation to society, it would be more of a preventive factor.

F. Relation of religion to illness.—Most of the students recognized the importance of a patient's religion in relation to health and disease. The majority felt that a patient's faith is a positive force in healing and recovering from both physical and emotional illnesses. One student said: "Religion has a great bearing on health, probably more than microbes." The element of emotional overlay in most organic illnesses was strongly recognized by the group. Since a patient's religion would strongly influence this psychic element, it was felt that religion would certainly influence recovery from the illness even if it were organic in its basic nature. The importance of a stable faith was again stressed, feeling that religious faith could provide a restful inspiration, or it could foster dependence and weakness. "Religion can provide man with a vehicle with which he can move toward self-realization, or it can provide him with the get-away car."

Eighty per cent of the group felt that members of certain religious groups are especially prone to develop mental disorders. Many felt that certain groups attract persons who are already disturbed and that some mental disorder is a reason for group membership. Others felt that certain strict religious groups seemed more prone to develop mental disorders. (Several also pointed out that religious groups are also ethnic groups in many cases and consequently the influence of heredity should be considered in evaluating the etiology of a mental disorder.) Strict religious groups tended to make demands in everyday life and limit the flexibility of their followers in adapting to new surroundings and situations, thus rendering them less able to achieve good mental health.

G. Students' response to questionnaire.—Two-thirds of the group enjoyed answering the questionnaire, although those who came from the numerically strong religious groups generally showed the least enthusiasm. Most of the students welcomed the opportunity to consider their concepts of religion and try to define these more clearly for themselves. Many found that the task was much more difficult than they had first thought, and that their concepts of religion were "limited and vague." Some enjoyed "the opportunity to witness to" their own beliefs. One student felt that "this questionnaire was a wonderful spiritual review for me and brought me much comfort and peace of mind." Another said that he had always been a little ashamed of his lack of faith in the fundamental tenets of Christianity; replying to the questionnaire became a

form of confession which brought him considerable relief.

In the third who did not enjoy answering the questions many said that the questions provoked a "none of your business" attitude. The rest felt confusion and bewilderment as to how to state their beliefs, and did not find this experience gratifying. One student expressed what many students felt: "First, I know that a psychiatrist will read the answers. Secondly, these questions are difficult to answer, for what I have written does not express all that I believe."

SUMMARY

In answer to most of the questions the students generally expressed beliefs that a conventionally religious person would give; thus, it would appear that the class as a whole is moderately religious. It is difficult, however, to estimate the depth of this religiousness because many students may have given answers which they felt were expected of them, rather than expressing their innermost thoughts.[4] In addition, the subject covered by this questionnaire and the nature of many of the questions were such that inevitably some answers tended to be superficial and social instead of deep and individual. For the most part, the answers showing the greatest amount of thought were given by students who had rebelled, in one way or another, against the faith of their childhood.

The majority of the students seemed to have experienced no deep conflicts between religious and other aspects of their life. For a small number, however, religion had at some time been an all-consuming problem. Again, those who had experienced some religious conflict gave the most penetrating answers. Most of the students had experienced and resolved their conflicts prior to or during their college years and, consequently, had few religious conflicts in medical school.

The study of medicine brought to some students a sense of appreciation and awe for the intricacies of the human body, and hence a deepened understanding of their religion. Others were so involved with technicalities that they found medical school intellectually stifling, and hence gave little thought to religion.

A large number of the students indicated that they would integrate their religious beliefs into their practice of medicine. Most students felt that religion played a considerable role, either beneficial or detrimental, in mental illness. Many recognized the close interaction between physical and mental illnesses and the difficulty in completely separating one from the other.

This study has dealt with the religious attitudes and beliefs of a group of medical students. Although the students have expressed many interesting and valuable ideas, it is difficult to determine which of their beliefs were influenced by their medical education and which were fixed before they entered medical school. A similar questionnaire given in the first year of medical school and then repeated in the final year might reveal what changes in the students' attitudes and beliefs came as a result of medical education. The present study has been extended, and a questionnaire which lends itself to better quantitation of responses is now being formulated. This quantitative questionnaire will then be given to the students on entering medical school, and then again at the close of the senior year.

[4] We tried to get honest replies by keeping each person's questionnaire anonymous. Also, since the person conducting the study knew the students rather well and had worked with them moderately long and intensively, it is felt that he had their trust and confidence and that this contributed to the frankness and sincerity of the participants.

Changes in Professional Careers of Physicians. An Analysis of a Resurvey of Physicians Who Were Graduated from Medical College in 1935, 1940, and 1945*

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* This study was partially supported by a grant (RG-6388) from the U.S. Public Health Service.

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INTRODUCTION

Several reports on "Trends in Medical Practice" have been made over the years, based on surveys of the graduates of American medical colleges of every fifth class from 1915 through 1950.[1] These surveys were made at various intervals (6 years to 15 years) after graduation to study changing patterns in type and method of practice, graduate training, and location of practice. Each of the studies presented the pattern of post-M.D. career characteristics of a given class a certain number of years after graduation. To determine whether the distribution of graduates by these characteristics tends to remain the same for a particular class or changes over a period of time, a follow-up survey was made of the 1935, 1940, and 1945 graduates who had replied to the original surveys of these classes. The resurvey was made in 1959 and provides an opportunity to study changes which have taken place between the first surveys and 1959.[2]

The names and current addresses of all living graduates of American medical colleges of the classes of 1935, 1940, and 1945 were furnished by the American Medical Association. These names were checked against the questionnaires returned in the first surveys. A resurvey questionnaire was sent to each graduate on the current American Medical Association list who had completed the first questionnaire.

About three-fourths of the resurvey questionnaires were returned. For each class, the per cent of returns was higher than the per cent of returns in the first surveys (Table 1). The per cent of returns was highest for those graduates who had limited their practice to a specialty at the time of the first survey and next highest for those giving special attention to a specialty (Table 2). For those in general practice at the time of the first survey, between 67 and 68 per cent replied to the resurvey. A somewhat higher proportion of those in non-private practice at the time of the first survey replied in the resurvey than of those who were in private practice (77–80 per cent for the former compared with 71–74 per cent for the latter).

Because of these differences, the present analysis is limited to those graduates who replied to the resurvey. Wherever data are presented for the first surveys, they are based on those graduates who replied in both surveys. For this reason the figures will not always agree with those in the published reports of the first surveys of the 1935, 1940, and 1945 classes.

Many different dates and time intervals are involved in the first surveys and resurveys of the 1935, 1940, and 1945 medical college graduates. These are summarized below:

	Year of graduation		
	1935	1940	1945
Date of first survey	1950	1950	1954
Date of resurvey	1959	1959	1959
Years between:			
Graduation and first survey	15	10	9
First survey and resurvey	9	9	5
Graduation and resurvey	24	19	14

Since many aspects of medical practice such as specialization and graduate training are related to the interval between graduation and the survey, cau-

[1] The reports of the earlier surveys have been published in the *Journal of the Association of American Medical Colleges* and the *Journal of Medical Education*. See References 1-6.

[2] A copy of the questionnaire used for the resurvey of the 1935 and 1940 graduates is shown at the end of this report. The questionnaire for the resurvey of the 1945 graduates differed only in the dates specified in questions 10 and 11.

TABLE 1

MEDICAL COLLEGE GRADUATES RETURNING QUESTIONNAIRES IN TWO SURVEYS: 1935, 1940, 1945 CLASSES

ITEM	YEAR OF GRADUATION 1935	1940	1945
No. graduates	4,849	4,886	5,727
Questionnaires returned, 1st survey	3,186	3,534	4,225
Deaths, 1st survey to 1959	120	67	21
Number resurveyed	3,066	3,467	4,204
Questionnaires returned, resurvey	2,239	2,535	3,150
Per cent returned:			
First survey	65.7	72.3	73.8
Resurvey	73.0	73.1	74.9

TABLE 2

PER CENT OF RETURNS IN RESURVEY, BY TYPE AND METHOD OF PRACTICE IN FIRST SURVEY: 1935, 1940, 1945 CLASSES

TYPE AND METHOD OF PRACTICE FIRST SURVEY	YEAR OF GRADUATION 1935	1940	1945
	Per cent of returns		
Total	73.0	73.1	74.9
Type of practice:			
General practice	67.0	67.9	68.4
Special attention to a specialty.	73.1	69.7	72.5
Limited to a specialty	75.6	75.6	77.1
Not in practice or type not reported	66.7	70.2	55.8
Method of practice:			
Private practice	72.0	71.4	74.4
Individual	71.6	70.6	73.9
Partnership or group	73.9	75.8	75.4
Nonprivate practice	78.6	79.7	77.2
Non-Federal hospital	87.3	96.7	78.5
Teaching and/or research	76.1	72.8	76.6
Public health	86.6	72.9	71.2
Federal government	73.0	76.9	81.1
In training	88.5	85.6	78.7
All other	73.7	81.0	58.7

tion must be used in making comparisons among the different classes studied. For this reason the analysis will deal with the changes between the first survey and the resurvey for each of the three classes separately.

TYPE OF PRACTICE

Graduates were asked to indicate their type of practice as either general practice, general practice with special attention to a specialty, practice limited to a specialty, or not in practice. In this analysis, persons in residency training at the time of the surveys were included with those limiting practice to a specialty.

1935 medical college graduates.—In the 9 years between the first survey and the resurvey of the 1935 class the overall change in type of practice was slight. An almost negligible decrease occurred in the proportion of general practitioners but a more significant decrease in the proportion of those giving special attention to a specialty (Table 3). If these two groups are combined, information is obtained on physicians available for the family practice of medicine. The proportion of such physicians dropped from

TABLE 3

PER CENT DISTRIBUTION OF 1935 MEDICAL COLLEGE GRADUATES, BY TYPE OF PRACTICE IN TWO SURVEYS

Type of practice	First survey 1950	Resurvey 1959
Total	100.0	100.0
General practice	20.8	19.6
Special attention to a specialty	20.0	16.3
Limited to a specialty	58.0	59.0
Not in practice or type not reported	1.2	5.1

41 per cent to 26 per cent between surveys. The proportion of those whose practice was limited to a specialty increased slightly. The increase in the proportion of graduates not in practice or with type of practice not reported is largely the result of the increase from 19 to 100 in the number of graduates who did not report type of practice. Many physicians in administrative and academic positions failed to indicate type of practice. The number of graduates who were not in practice increased from 7 to 15 between surveys.

The data in Table 3 reflect the net effect of changes toward more limited practice by general practitioners and those giving special attention to a specialty and changes toward less limited practice by limited specialists and those giving special attention to a specialty. Since some of these individual changes tend to cancel one another, the net change does not reflect the actual amount of change. Table 4 presents the individual changes and shows in detail the number and proportion of graduates making the various kinds of change by type of practice in the first survey. Almost 75 per cent of those in general practice and 55 per cent of those giving special attention to a specialty at the time of the first survey were found in the same type of practice in the resurvey. The corresponding figure for those who had limited practice to a specialty in the first survey was over 90 per cent. Almost 20 per cent of the general practitioners changed to special attention to a specialty, whereas about 5 per cent changed to limited to a specialty. Over 20 per cent of those giving special attention to a specialty changed to limited specialty, and about the same proportion changed to general practice. Of the limited specialists who changed type of practice, the greatest number changed to not in practice or type not reported.

If the figures in Table 4 for graduates in general practice and those giving special attention to a specialty are combined to give data on physicians available for the family practice of medicine, the results are as follows:

CHANGE IN TYPE OF PRACTICE 1950-59	GRADUATES IN FAMILY PRACTICE, FIRST SURVEY, 1950	
	No.	Per cent
Total	914	100.0
No change	764	83.6
Change to limited to a specialty	119	13.0
Change to not in practice or type not reported	31	3.4

One hundred and fifty of the physicians in family practice in 1950 changed to other types of practice or had left practice by 1959. Table 4 shows that only 37 graduates changed to family practice, from limited to a specialty in the 9-year period.

The number of graduates who had limited their practice to a specialty at the time of the resurvey is shown in Table 5 for each specialty. The table also shows the proportion of graduates

TABLE 4

CHANGE IN TYPE OF PRACTICE OF 1935 MEDICAL COLLEGE GRADUATES BETWEEN SURVEYS, BY TYPE OF PRACTICE IN FIRST SURVEY

Type of practice first survey and change, 1950-59	No. graduates	Per cent distribution
All types of practice:*	2,213	100.0
No change	1,786	80.7
Change to more limited practice	208	9.4
Change to less limited practice	125	5.7
Change to not in practice or type not reported	94	4.2
General practice:	466	100.0
No change	341	73.2
Change to special attention to a specialty	89	19.1
Change to limited to a specialty	22	4.7
Change to not in practice or type not reported	14	3.0
Special attention to a specialty:	448	100.0
No change	246	54.9
Change to limited to a specialty	97	21.7
Change to general practice	88	19.6
Change to not in practice or type not reported	17	3.8
Limited to a specialty:	1,299	100.0
No change	1,199	92.3
Change to special attention to a specialty	28	2.2
Change to general practice	9	0.7
Change to not in practice or type not reported	63	4.8

* Excludes 26 graduates not in practice or type not reported in first survey.

TABLE 5

LIMITED SPECIALISTS AMONG 1935 MEDICAL COLLEGE GRADUATES WITH AMERICAN BOARD CERTIFICATES IN TWO SURVEYS, BY RESURVEY SPECIALTY

Resurvey specialty	No. limited specialists in resurvey 1959	PER CENT WITH AMERICAN BOARD CERTIFICATES		
		Resurvey 1959	First survey 1950	1950-1959
All specialties	1,321	72.1	61.4	10.7
Anesthesiology	38	63.2	55.3	7.9
Dermatology	38	71.1	50.0	21.1
Internal medicine	245	70.6	63.7	6.9
Neurological surgery	6	100.0	100.0	.....
Obstetrics and gynecology	132	73.5	58.3	15.2
Ophthalmology, otology, laryngology, rhinology	153	83.7	75.9	7.8
Orthopedic surgery	53	81.1	69.8	11.3
Pathology, clinical pathology	27	96.3	77.8	18.5
Pediatrics	80	70.0	65.0	5.0
Physical medicine	7	71.4	57.1	14.3
Plastic surgery	6	83.3	83.3	.....
Proctology	18	50.0	22.2	27.8
Psychiatry, neurology	100	73.0	66.0	7.0
Public health	35	62.9	37.2	25.7
Radiology	81	93.8	80.2	13.6
Surgery	183	65.0	53.0	12.0
Thoracic surgery	10	90.0	80.0	10.0
Urology	48	77.1	70.9	6.2
All other	61	27.9	16.4	11.5

TABLE 6

PER CENT DISTRIBUTION OF 1940 MEDICAL COLLEGE GRADUATES, BY TYPE OF PRACTICE IN TWO SURVEYS

Type of practice	First survey 1950	Resurvey 1959
Total	100.0	100.0
General practice	19.3	16.4
Special attention to a specialty	13.1	9.7
Limited to a specialty	66.3	71.1
Not in practice or type not reported	1.3	2.8

in each specialty who held certificates from American Specialty Boards in 1950 and 1959. In 1959, the highest proportions certified were for neurological surgery, pathology, and radiology. For the latter two specialties this is not surprising, because hospital standards may require certification in these specialties.

The American Specialty Boards have been in existence for varying lengths of time. The American Board of Ophthalmology was activated in 1915 and the American Boards of Proctology and Thoracic Surgery in 1949. The Boards differ in the number of years of training and practice of the specialty required for certification. For the first few years after a Board is activated, practicing specialists have usually been able to obtain certification without examination under a "Grandfather" clause. The effect of these facts can be seen in the proportion of specialists certified in Table 5. The Boards of Preventive Medicine and Proctology were activated in the late 1940's, and comparatively few of the specialists in these fields were certified by 1950.

1940 medical college graduates.—The proportions of both general practitioners and of those giving special attention to a specialty among 1940 graduates decreased between 1950 and 1959, whereas the proportion of those limiting practice to a specialty increased (Table 6). Examination of the changes entering into these net results shows that the actual changes were somewhat larger than the net results would indicate. About 45 per cent of those giving special attention to a specialty made no change in type of practice, whereas over 70 per cent of the general practitioners and over 95 per cent of the limited specialists made no change (Table 7). Of the general practitioners who did change, more changed to "special attention to a specialty" than to "limited to a specialty." Almost twice as many graduates who were giving special attention to a specialty changed to "limited to a specialty" as to general practice.

The combination of general practitioners and those giving special attention to a specialty gives the following data on physicians available for family practice:

CHANGE IN TYPE OF PRACTICE 1950-59	GRADUATES IN FAMILY PRACTICE, FIRST SURVEY, 1950	
	No.	Per cent
Total	821	100.0
No change	628	76.5
Change to limited to a specialty	169	20.6
Change to not in practice or type not reported	24	2.9

Compared with the 193 physicians in family practice who left this type of practice between surveys, only 30 of the limited specialists changed to family practice in the same interval (Table 7).

Table 8 shows the number of 1940 graduates who had limited their practice

TABLE 7

CHANGE IN TYPE OF PRACTICE OF 1940 MEDICAL COLLEGE GRADUATES BETWEEN SURVEYS, BY TYPE OF PRACTICE IN FIRST SURVEY

Type of practice first survey and change, 1950-59	No. graduates	Per cent distribution
All types of practice:*	2,502	100.0
No change	2,117	84.6
Change to more limited practice	240	9.6
Change to less limited practice	93	3.7
Change to not in practice or type not reported	52	2.1
General practice:	488	100.0
No change	346	70.9
Change to special attention to a specialty	71	14.5
Change to limited to a specialty	58	11.9
Change to not in practice or type not reported	13	2.7
Special attention to a specialty:	333	100.0
No change	148	44.5
Change to limited to a specialty	111	33.3
Change to general practice	63	18.9
Change to not in practice or type not reported	11	3.3
Limited to a specialty:	1,681	100.0
No change	1,623	96.5
Change to special attention to a specialty	25	1.5
Change to general practice	5	0.3
Change to not in practice or type not reported	28	1.7

* Excludes 69 graduates not in practice or type not reported in first survey.

TABLE 8

LIMITED SPECIALISTS AMONG 1940 MEDICAL COLLEGE GRADUATES WITH AMERICAN BOARD CERTIFICATES IN TWO SURVEYS, BY RESURVEY SPECIALTY

Resurvey specialty	No. limited specialists in resurvey 1959	PER CENT WITH AMERICAN BOARD CERTIFICATES Resurvey 1959	First survey 1950	1950-1959
All specialties	1,801	75.4	38.4	37.0
Anesthesiology	55	65.5	31.0	34.5
Dermatology	46	89.1	63.0	26.1
Internal medicine	404	63.6	34.9	28.7
Neurological surgery	19	94.7	31.5	63.2
Obstetrics and gynecology	186	73.7	23.2	50.5
Ophthalmology, otology, laryngology, rhinology	159	83.6	47.1	36.5
Orthopedic surgery	99	87.9	37.4	50.5
Pathology, clinical pathology	60	88.3	63.3	25.0
Pediatrics	118	78.0	51.7	26.3
Physical medicine	10	70.0	30.0	40.0
Plastic surgery	13	76.9	15.4	61.5
Proctology	7	57.1	14.2	42.9
Psychiatry, neurology	118	77.1	42.4	34.7
Public health	23	56.5	21.7	34.8
Radiology	103	92.2	67.0	25.2
Surgery	285	78.2	36.1	42.1
Thoracic surgery	5	60.0	40.0	20.2
Urology	57	82.5	12.3	70.2
All other	34	32.4	5.9	26.5

TABLE 9

PER CENT DISTRIBUTION OF 1945 MEDICAL COLLEGE GRADUATES BY TYPE OF PRACTICE IN TWO SURVEYS

Type of practice	First survey 1954	Resurvey 1959
Total	100.0	100.0
General practice	17.2	14.1
Special attention to a specialty	5.6	7.1
Limited to a specialty	76.3	78.3
Not in practice or type not reported	0.9	0.5

to each specialty in the resurvey, together with the proportions who were certified by the American Specialty Boards. Half of those certified by 1959 had already received their certification by 1950 when the first survey was made. Considerable variation occurred in these proportions from one specialty to another. For dermatology, pathology, pediatrics, radiology, and thoracic surgery, over twice as many had been certified by 1950 as were certified between 1950 and 1959. On the other hand, for neurological surgery, obstetrics and gynecology, plastic surgery, proctology, and urology well over twice as many were certified between 1950 and 1959 as by 1950.

1945 medical college graduates.—As was true for the 1935 and 1940 classes, there was a decrease in the proportion of the 1945 graduates in general practice in the period between the first survey and the resurvey. For this class, both limited specialists and those giving special attention to a specialty increased proportionately in the same period (Table 9). Of the general practitioners who changed type of practice, more changed to "special attention to a specialty" than to "limited to a specialty" (Table 10). For those giving special attention to a specialty, 20 per cent changed to "limited to a specialty" and almost 25 per cent changed to general practice. Ninety-eight per cent of the limited specialists made no change in type of practice.

One hundred of the graduates in family practice in 1954 made a change in the 5 years between surveys:

CHANGE IN TYPE OF PRACTICE 1954-59	GRADUATES IN FAMILY PRACTICE, FIRST SURVEY, 1954	
	No.	Per cent
Total	719	100.0
No change	619	86.1
Change to limited to a specialty	99	13.8
Change to not in practice or type not reported	1	0.1

Table 10 shows that only 43 of the limited specialists changed to family practice in this period.

Table 11 shows the number of 1945 graduates who had limited their practice to each specialty by 1959, together with the proportion with certificates from the American Specialty Boards. Almost three-fourths of the limited specialists were certified by 1959, 46 per cent by 1954, and 28 per cent in the 5-year period of 1954–59. The highest proportions of certification in 1959 were for radiology (95 per cent) and pathology (90 per cent), followed by dermatology and the surgical specialties with 82–83 per cent certified.

Summary for type of practice.—For each of the three classes studied, the proportion of general practitioners decreased and the proportion of limited specialists increased between the first survey and the resurvey. Graduates giving special attention to a specialty decreased between surveys for the 1935

TABLE 10

CHANGE IN TYPE OF PRACTICE OF 1945 MEDICAL COLLEGE GRADUATES BETWEEN SURVEYS, BY TYPE OF PRACTICE IN FIRST SURVEY

Type of practice first survey and change, 1954-59	No. graduates	Per cent distribution
All types of practice:*	3,121	100.0
No change	2,846	91.2
Change to more limited practice	184	5.9
Change to less limited practice	85	2.7
Change to not in practice or type not reported	6	0.2
General practice:	542	100.0
No change	393	72.5
Change to special attention to a specialty	85	15.7
Change to limited to a specialty	63	11.6
Change to not in practice or type not reported	1	0.2
Special attention to a specialty:	177	100.0
No change	99	55.9
Change to limited to a specialty	36	20.4
Change to general practice	42	23.7
Change to not in practice or type not reported	0	.....
Limited to a specialty:	2,402	100.0
No change	2,354	98.0
Change to special attention to a specialty	37	1.6
Change to general practice	6	0.2
Change to not in practice or type not reported	5	0.2

* Excludes 29 graduates not in practice or type not reported in first survey.

TABLE 11

LIMITED SPECIALISTS AMONG 1945 MEDICAL COLLEGE GRADUATES WITH AMERICAN BOARD CERTIFICATES IN TWO SURVEYS, BY RESURVEY SPECIALTY

Resurvey specialty	No. limited specialists in resurvey 1959	PER CENT WITH AMERICAN BOARD CERTIFICATES Resurvey 1959	First survey 1954	1954-1959
All specialties	2,468	73.7	45.9	27.8
Anesthesiology	92	67.4	45.7	21.7
Dermatology	48	83.3	75.0	8.3
Internal medicine	585	62.7	35.2	27.5
Neurological surgery	27	81.5	33.4	48.1
Obstetrics and gynecology	211	74.9	24.7	50.2
Ophthalmology, otology, laryngology, rhinology	149	87.2	67.1	20.1
Orthopedic surgery	94	81.9	34.0	47.9
Pathology, clinical pathology	99	89.9	66.7	23.2
Pediatrics	232	78.9	65.5	13.4
Physical medicine	13	61.5	46.1	15.4
Plastic surgery	11	81.8	27.3	54.5
Proctology	3	66.7	.....	66.7
Psychiatry, neurology	206	75.2	55.8	19.4
Public health	20	30.0	20.0	10.0
Radiology	154	94.8	87.7	7.1
Surgery	363	76.0	39.4	36.6
Thoracic surgery	30	83.3	70.0	13.3
Urology	74	74.3	9.4	64.9
All other	57	15.8	7.0	8.8

TABLE 12

PER CENT DISTRIBUTION OF 1935 MEDICAL COLLEGE GRADUATES, BY METHOD OF PRACTICE IN TWO SURVEYS

Method of practice	First survey 1950	Resurvey 1959
Total	100.0	100.0
Private practice	82.7	85.2
Nonprivate practice:	16.9	13.7
Non-Federal hospital*	3.1	2.1
Teaching and/or research	2.4	2.0
Public health	2.6	3.1
Federal government†	5.3	4.5
Resident, fellow	1.0	0.1
All other	2.5	1.9
Not in practice	0.4	1.1

* Includes graduates serving abroad in mission hospitals.
† Excludes U.S. Public Health Service which is included in public health.

TABLE 13

PER CENT DISTRIBUTION OF 1935 MEDICAL COLLEGE GRADUATES IN PRIVATE PRACTICE, BY KIND OF PRIVATE PRACTICE IN TWO SURVEYS

Kind of private practice	First survey 1950	Resurvey 1959
Total in private practice both surveys	100.0	100.0
Individual	88.2	75.4
Partnership or group practice	11.8	24.6

and 1940 classes but increased slightly for the 1945 class.

Proportionately more of the physicians giving special attention to a specialty in the first survey changed their type of practice for each of the three classes. Very few limited specialists changed type of practice.

About three-fourths of the limited specialists in each class had been certified by an American Specialty Board by 1959.

METHOD OF PRACTICE

Physicians considered here as in private practice are those in individual, partnership, or group practice, whether their incomes are derived from fees for service, percentage arrangements, or salaries. Physicians in nonprivate practice may be engaged in teaching and/or research, graduate training, hospital service, public health, military service, or medical administration.

1935 medical college graduates.—There was a small increase in the proportion of 1935 graduates in private practice between 1950 and 1959 and a corresponding decrease in the proportion in nonprivate practice (Table 12). Each method of nonprivate practice showed a decrease except public health which showed a slight increase in the period.

Table 13 shows the distribution of the graduates who were in private practice in both 1950 and 1959 by kind of private practice. There was a decrease in the proportion in individual practice and a

corresponding increase in the proportion in partnership and group practice in the 9-year period. These figures are the net results of changes in both directions.

The more detailed changes in kind of private practice were as follows:

KIND OF PRIVATE PRACTICE, FIRST SURVEY, 1950	PER CENT DISTRIBUTION OF GRADUATES IN PRIVATE PRACTICE IN BOTH SURVEYS
Total	100.0
Individual:	
No change	72.7
Change to partnership or group	15.5
Partnership or group:	
No change	9.1
Change to individual	2.7

Over-all, 82 per cent of the graduates in private practice in both surveys were in the same kind of private practice both times. Over 5 times as many changed to partnership or group practice as left this kind of practice.

The proportion of 1935 graduates with full-time salaried positions (including residents and fellows) dropped from 18 per cent in 1950 to 15 per cent in 1959. Elimination of graduates in residencies and fellowships, which are limited in duration, from those with full-time salaried positions lowers the percentage for 1950 slightly but does not change the percentage for 1959.

About the same proportions of full-time salaried positions (13 per cent) were in the field of teaching and/or research in 1950 and 1959. However, the actual number of graduates in these fields dropped from 54 to 45. Of the 54 graduates in full-time salaried teaching and/or research positions in 1950, only 32 were in the same kind of position in 1959 (left side of Chart 1). Sixteen had changed to private practice, and six had changed to some other kind of full-time salaried position. The right side of Chart 1 shows what the 45 graduates in full-time salaried teaching and/or research positions in 1959 were doing in 1950. Thirty-two were in the same kind of position, six were in private practice, and seven were in some other kind of full-time salaried position.

1940 medical college graduates.—Between 1950 and 1959 there was a con-

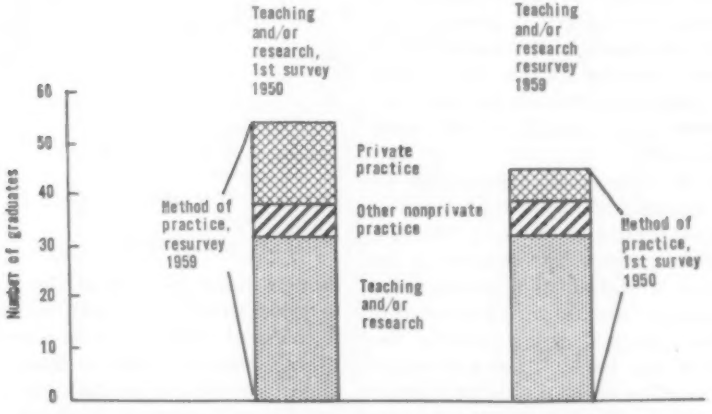

CHART 1.—Change in method of practice of 1935 medical college graduates in full-time salaried teaching and/or research positions in either survey.

TABLE 14

PER CENT DISTRIBUTION OF 1940 MEDICAL COLLEGE GRADUATES, BY METHOD OF PRACTICE IN TWO SURVEYS

Method of practice	First survey 1950	Resurvey 1959
Total	100.0	100.0
Private practice	77.3	84.3
Nonprivate practice:	22.0	14.8
Non-Federal hospital*	3.4	2.6
Teaching and/or research	5.0	3.8
Public health	1.7	1.8
Federal government†	6.5	4.3
Resident, fellow	3.5	0.5
All other	1.9	1.8
Not in practice	0.7	0.9

* Includes graduates serving abroad in mission hospitals.
† Excludes U.S. Public Health Service which is included in public health.

TABLE 15

PER CENT DISTRIBUTION OF 1940 MEDICAL COLLEGE GRADUATES IN PRIVATE PRACTICE, BY KIND OF PRIVATE PRACTICE IN TWO SURVEYS

Kind of private practice	First survey 1950	Resurvey 1959
Total in private practice both surveys	100.0	100.0
Individual	82.6	70.1
Partnership or group practice	17.4	29.9

siderable increase in the proportion of 1940 graduates engaged in private practice and a decrease in the proportion in nonprivate practice (Table 14). Each kind of nonprivate practice showed a decline except public health which stayed about the same.

Table 15 shows the distribution by kind of private practice of the graduates in private practice in both surveys. There was a considerable decrease in the proportion in individual practice and a corresponding increase in the proportion in partnership and group practice between 1950 and 1959. These net results reflect the effect of changes in both directions and again tend to obscure the greater amount of individual changes, the details of which were as follows:

KIND OF PRIVATE PRACTICE, FIRST SURVEY, 1950	PER CENT DISTRIBUTION OF GRADUATES IN PRIVATE PRACTICE IN BOTH SURVEYS
Total	100.0
Individual:	
No change	65.5
Change to partnership or group	17.1
Partnership or group:	
No change	12.8
Change to individual	4.6

Seventy-eight per cent of the graduates in private practice in both surveys were in the same kind of private practice both times. Almost 4 times as many changed from individual to partnership or group practice as made the change in the opposite direction.

The proportion of 1940 medical grad-

uates with full-time salaried positions dropped from 25 per cent in 1950 to 16 per cent in 1959. The figure for 1950 exclusive of residents and fellows was 22 per cent; the figure for 1959 was unchanged by this exclusion.

There were 126 graduates of the 1940 class in full-time salaried teaching and/or research positions in 1950 and 97 in such positions in 1959 (Chart 2). Of those in full-time teaching and/or research in 1950, 70 held the same kind of position in 1959, 34 had changed to private practice, and 22 to some other kind of salaried position. Of the 97 with full-time salaried teaching and/or research positions in 1959, 70 had had similar positions in 1950, twelve had been in private practice, and fifteen had held some other kind of salaried position at the time of the earlier survey.

1945 medical college graduates.—The resurvey showed that for this class (as for the other two classes studied) there was a sharp increase in the proportion of graduates in private practice between the first survey and the resurvey (Table 16). Each kind of nonprivate practice showed a decrease except public health which stayed about the same and "all other" which increased slightly.

Table 17 shows the kind of private

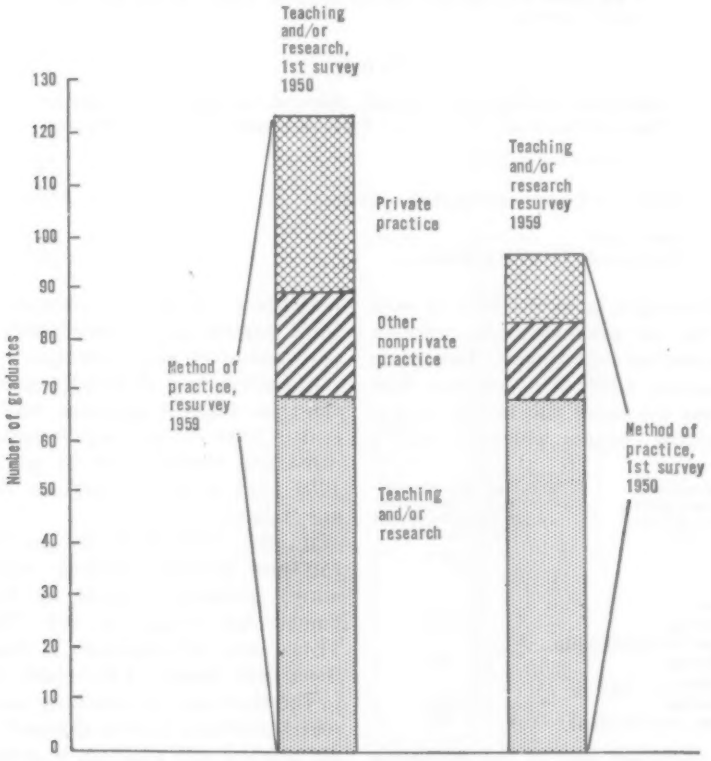

CHART 2.—Change in method of practice of 1940 medical college graduates in full-time salaried teaching and/or research positions in either survey.

TABLE 16

PER CENT DISTRIBUTION OF 1945 MEDICAL COLLEGE GRADUATES, BY METHOD OF PRACTICE IN TWO SURVEYS

Method of practice	First survey 1954	Resurvey 1959
Total	100.0	100.0
Private practice	74.1	84.1
Nonprivate practice:	25.3	15.4
Non-Federal hospital*	4.1	2.6
Teaching and/or research	6.1	5.1
Public health	1.6	1.7
Federal government†	8.2	3.5
Resident, fellow	4.1	0.8
All other	1.2	1.7
Not in practice	0.6	0.5

* Includes graduates serving abroad in mission hospitals.
† Excludes U.S. Public Health Service which is included in public health.

TABLE 17

PER CENT DISTRIBUTION OF 1945 MEDICAL COLLEGE GRADUATES IN PRIVATE PRACTICE, BY KIND OF PRIVATE PRACTICE IN TWO SURVEYS

Kind of private practice	First survey 1954	Resurvey 1959
Total in private practice both surveys	100.0	100.0
Individual	62.9	63.2
Partnership or group practice	37.1	36.8

practice engaged in at the time of each survey by the graduates who were in private practice both times. Here again the composite effect of all changes does not reveal the more substantial nature of individual changes which are shown below:

KIND OF PRIVATE PRACTICE, FIRST SURVEY, 1954	PER CENT DISTRIBUTION OF GRADUATES IN PRIVATE PRACTICE IN BOTH SURVEYS
Total	100.0
Individual:	
No change	54.9
Change to partnership or group	8.0
Partnership or group:	
No change	28.8
Change to individual	8.3

A total of 84 per cent of the graduates in private practice in both surveys were in the same kind of private practice both times. There was an approximately equal interchange between individual and partnership or group practice.

The proportion of 1945 graduates with full-time salaried positions was 28 per cent in 1954 (24 per cent excluding residents and fellows) and 17 per cent in 1959 both with and without residents and fellows.

In 1954, there were 193 graduates in full-time salaried teaching and/or research positions, whereas by 1959 this number had dropped to 162 (Chart 3). There were 117 graduates in these positions both times. Fifty-eight of those in full-time salaried teaching and/or research positions in 1954 changed to private practice and eighteen to some other kind of salaried position. Of those in full-time salaried teaching and/or re-

search in 1959, sixteen had been in private practice in 1954, and 29 in some other kind of salaried position.

Summary for method of practice.—The proportion of graduates in private practice increased between surveys for each of the three classes. Of those in private practice both times, the vast majority were in the same kind of private practice at the first and resurveys. For the 1935 and 1940 classes, more graduates changed from individual practice to partnership or group practice than vice versa. For the 1945 class, about the same number made the two changes.

The number of graduates in full-time salaried teaching and/or research positions decreased between surveys for each of the three classes. More graduates changed from such positions to private

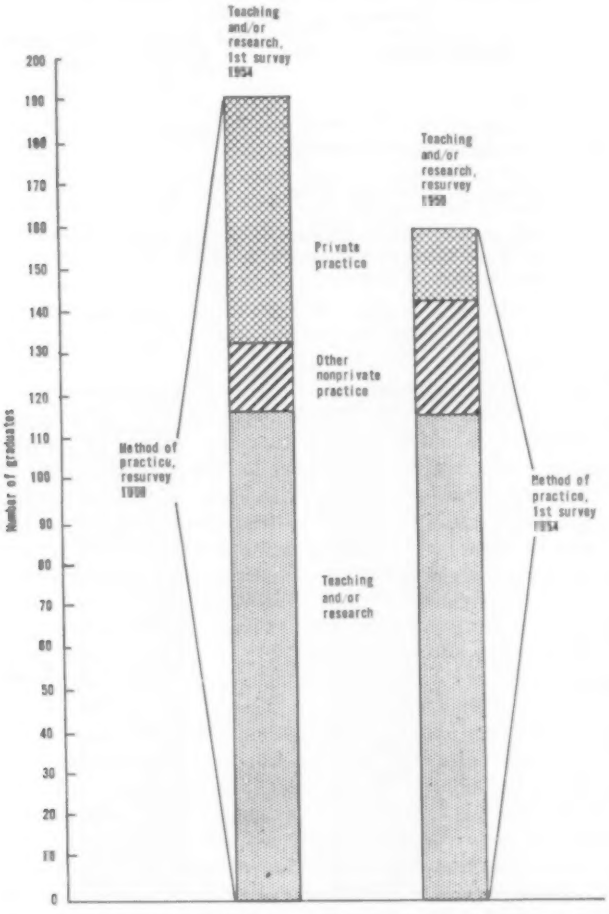

CHART 3.—Change in method of practice of 1945 medical college graduates in full-time salaried teaching and/or research positions in either survey.

practice than to other kinds of salaried positions. On the other hand, of those graduates who entered the full-time salaried teaching and/or research field between surveys, more came from other kinds of salaried positions than from private practice.

PLACE OF PRACTICE

1935 medical college graduates.—Of the 1,825 medical graduates in private practice at the time of the first survey in 1950, 1,664 or 91 per cent were practicing in the same city in 1959 (Table 18 and Chart 4). An additional 5 per

TABLE 18

CHANGE IN PLACE OF PRACTICE OF 1935 MEDICAL COLLEGE GRADUATES IN PRIVATE AND NONPRIVATE PRACTICE IN FIRST SURVEY

Change in place of practice, 1950-59	METHOD OF PRACTICE FIRST SURVEY, 1950	
	Private	Nonprivate
Total*	1,825	216
No change	1,664	152
Change to other city within same state	97	25
Change to a different state	63	38
Change to outside U. S.	1	1

* Excludes those in residency training, Federal Government, medical missionary work, or not in practice in either survey.

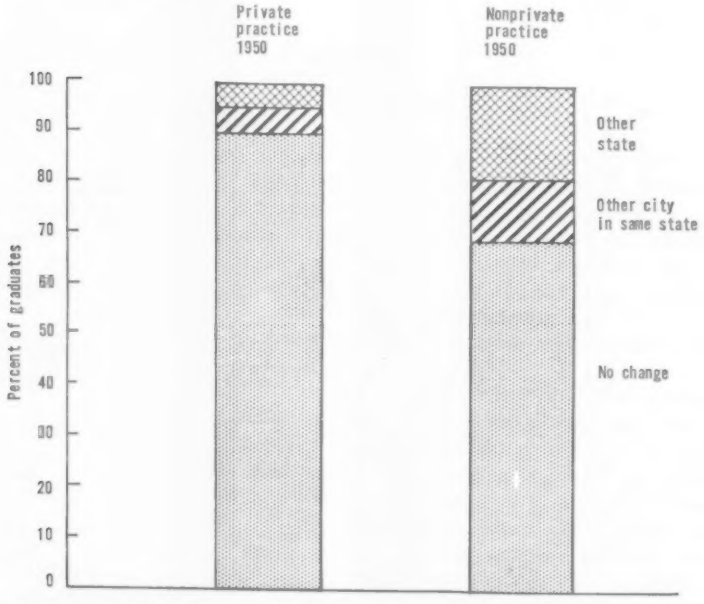

CHART 4.—Distribution of 1935 medical college graduates in private and nonprivate practice in first survey, by change in place of practice, 1950-59.

TABLE 19

CHANGE IN PLACE OF PRACTICE OF 1940 MEDICAL COLLEGE GRADUATES IN PRIVATE AND NONPRIVATE PRACTICE IN FIRST SURVEY

Change in place of practice, 1950-59	METHOD OF PRACTICE FIRST SURVEY, 1950	
	Private	Nonprivate
Total*	1,932	279
No change	1,652	170
Change to other city within same state	144	34
Change to different state	132	73
Change to outside U. S.	4	2

* Excludes those in residency training, Federal Government, medical missionary work, or not in practice in either survey.

cent had moved to another city in the same state. This means that 96 per cent of those in private practice in 1950 were practicing in the same state in 1959. Of those graduates in nonprivate practice in 1950, 70 per cent were in the same city; 12 per cent had changed to another city in the same state—making a total of 82 per cent who were in the same state in 1950 and 1959.

There were 1,322 of the 1935 graduates in private practice in a metropolitan area in 1950. Ninety-six per cent of them were practicing in the same metropolitan area in 1959, 2 per cent were practicing in a different metropolitan area, and 2 per cent were practicing outside a metropolitan area. For those in nonprivate practice in a metropolitan area in 1950, the corresponding percentages were 81, 12, and 7.

Only 6 per cent of those in private practice in the first survey were practicing in a place of different size in the resurvey. For those in nonprivate practice, the figure was 20 per cent. For both groups there were more graduates changing from a larger to a smaller sized community than vice versa in the 9-year period.

Of the 1935 graduates in private practice in 1950 who gave a reason for changing their place of practice between 1950 and 1959, more gave "climate" than any other single reason. Among the graduates of this class in nonprivate practice in 1950, the most frequently given reason was "to obtain a better situation."

1940 medical college graduates.—Of the 1940 graduates in private practice in 1950, 1,652 or 85 per cent were practicing in the same city in 1959 (Table 19 and Chart 5). About half of the remainder in private practice in 1950 were practicing in another city in the same state and half in another state. Among those in nonprivate practice in 1950, 61 per cent were in the same city in 1959. Of those in the nonprivate practice group who changed place of practice in the 9-year period, over twice as many changed to a different state as changed to another city in the same state. Chart 5 shows that 93 per cent of those in private practice and 73 per cent of those in nonprivate practice in 1950 were located in the same state in 1959.

Of the 1,330 graduates of 1940 in private practice in a metropolitan area in 1950, 93 per cent were in the same metropolitan area in 1959, 4 per cent were in a different metropolitan area, and 3 per cent were outside a metropolitan area. For those in nonprivate practice in 1950, the corresponding percentages were 69, 24, and 7.

Ninety per cent of the 1940 graduates in private practice in 1950 were practicing in communities of the same size in 1959 whereas 4 per cent had moved to a larger one, and 6 per cent had relocated in a smaller place. The corresponding figures for graduates in nonprivate practice in 1950, were 72, 12, and 16 per cent.

Of the graduates in private practice in 1950 who changed their place of practice in the period 1950-59, more gave "to obtain a better situation" than gave any other single reason. Personal reasons were given next most frequently, followed by "climate," and "offered a salaried position." Among those in nonprivate practice, "offered a salaried position" was checked most often.

1945 medical college graduates.—Of the 2,298 graduates in private practice when first surveyed in 1954, 1,989 or 86 per cent were practicing in the same city in 1959 at the time of the resurvey (Table 20 and Chart 6). Eight per cent were in a different city in the same state, and 6 per cent were in a different state or abroad. Sixty-six per cent of the 1945 graduates in nonprivate practice in 1954 were in the same city, 10 per cent in a different city in the same state, and 24 per cent in a different state or abroad. In 1959, 94 per cent of those in private practice in 1954 and 76 per cent of those in nonprivate practice were practicing in the same state.

At the time of the first survey, 1,579 of the 1945 graduates were in private practice in a metropolitan area. The resurvey results showed that 94 per cent of them were in the same area, 4 per cent were in a different metropolitan

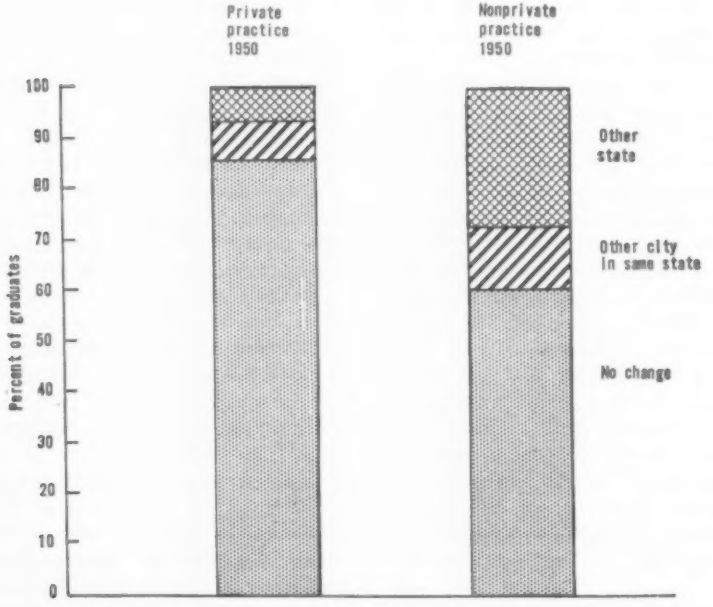

CHART 5.—Distribution of 1940 medical college graduates in private and nonprivate practice in first survey, by change in place of practice, 1950-59.

area, and 2 per cent were outside a metropolitan area. For graduates in nonprivate practice in 1954, the corresponding figures were 73 per cent, 19 per cent, and 8 per cent.

For 1945 graduates both in private and nonprivate practice in 1954, the majority were practicing in the same size place in 1959. For both groups, more graduates changed to a smaller place of practice in the 5-year period than to a larger place.

TABLE 20

CHANGE IN PLACE OF PRACTICE OF 1945 MEDICAL COLLEGE GRADUATES IN PRIVATE AND NONPRIVATE PRACTICE IN FIRST SURVEY

Change in place of practice, 1954-59	METHOD OF PRACTICE FIRST SURVEY, 1954	
	Private	Nonprivate
Total*	2,298	368
No change	1,989	243
Change to other city within same state	179	35
Change to different state	128	85
Change to outside U. S.	2	5

* Excludes those in residency training, Federal Government, medical missionary work, or not in practice in either survey.

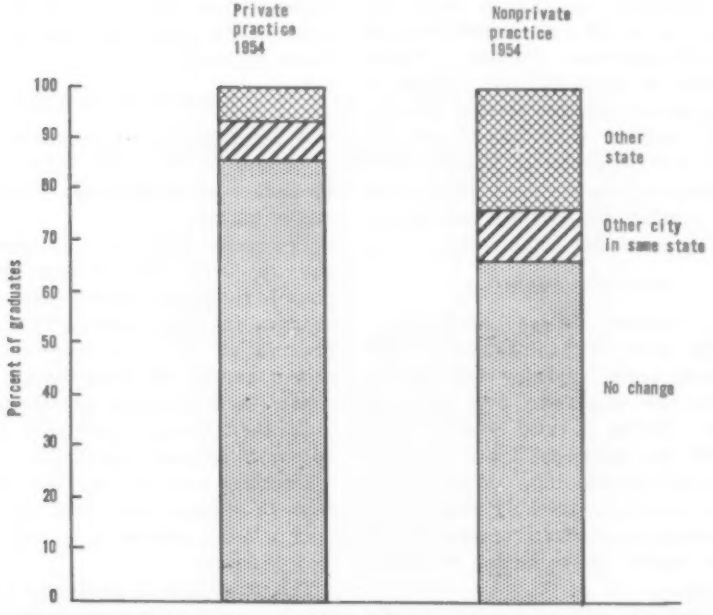

CHART 6.—Distribution of 1945 medical college graduates in private and nonprivate practice in first survey, by change in place of practice, 1954-59.

The single reason for changing place of practice given most frequently by 1945 graduates who were in private practice in 1954 was "to obtain a better situation." The next most frequently stated reasons for changing place of practice were "offered a salaried position," "to get nearer a medical center or hospital," and "climate." Equal numbers of graduates in private practice in 1954 checked these three reasons. Among the graduates in nonprivate practice in 1954, "to obtain a better situation" was indicated most frequently, followed by "offered a salaried position." The other reasons were checked much less frequently.

Summary for place of practice.—Overall, there was little tendency to change place of practice between surveys. An overwhelming majority of graduates in private practice were in the same state when resurveyed in 1959 as when first studied. As would be expected from the nature of nonprivate practice, a higher proportion of those in such practice in the first survey changed place of practice between surveys than was found for those in private practice. Among those who changed from one size place of practice to another, the greatest number relocated in a smaller community.

RESIDENCY TRAINING

1935 medical college graduates.—Sixty-five per cent of the 1935 graduates had taken some residency training by the time this class was first surveyed in 1950. In the interval between 1950 and 1959, an additional 1 per cent had taken residency training. Of those who reported residency training since 1950, such training most often represented additional rather than initial residency experience.

1940 medical college graduates.—By 1950, 78 per cent of the 1940 graduates had taken some residency training. At the time of the resurvey in 1959, the over-all proportion with residency training was 80 per cent. A few took residency training for the first time in the period 1950-59, and a larger number took additional training in this period.

1945 medical college graduates.—Eighty-three per cent of the 1945 graduates had taken residency training at the time of the first survey in 1954. By 1959, 85 per cent had residency training (including 39 graduates in residencies at the time of the resurvey). In the 5-year period, a few took such training for the first time and a somewhat larger number took additional training.

Summary for residency training.—Because of the varying circumstances with regard to such things as military service among the three classes, there was considerable variation in the pattern of residency training. However, by 1959, it appeared that higher proportions of the more recent graduates were taking residency training.

SUMMARY OF RESURVEY

A resurvey was made in 1959 of those graduates of the 1935, 1940, and 1945 medical college classes who had replied to earlier surveys.

The major finding of the resurvey was that relatively little change had taken place in the period between surveys. Such changes in type, method, and place of practice as did occur were fairly consistent among the three classes and between the first survey and the resurvey.

Of the changes noted, the following appear to be most significant:

As time goes on, medical graduates tend to change their type of practice from a more general to a more specialized practice.

The proportion of graduates in private practice tends to increase with the passing of time.

The over-all change from individual

practice to partnership or group practice tends to be greater than changes in the reverse direction.

The number of graduates in full-time teaching and/or research positions decreased between surveys. Those leaving such positions tended to go into private practice while those entering this field tended to come from other kinds of salaried positions.

Once a physician has set up a private practice, there is little tendency to change to another place of practice.

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Please do not write in this column

RESURVEY OF 1935 AND 1940 GRADUATES OF MEDICAL COLLEGES IN THE UNITED STATES

1. Name _____
   Last First Middle initial
2. Place of practice _____
   City State
3. Medical College _____
4. Nature of professional activities: (Check *one* to which most time is devoted.)
   1 ___ Care of patients
   2 ___ Teaching and/or research
   3 ___ Administration
   4 ___ Public health
   5 ___ Resident or fellow
   6 ___ Not related to medicine
   ___ Other _____ Specify
5. Source or sources of professional income:
   1 ___ Fee for service only
   2 ___ Fee for service and part-time salary
   3 ___ Full-time salary
   ___ Other _____ Specify
6. If in private practice, check organization of practice:
   1 ___ Individual
   2 ___ Partnership
   3 ___ Group
   ___ Other _____ Specify
7. If salaried (full or part-time), check principal *employer*:
   1 ___ State or local health department
   2 ___ Medical School
   3 ___ Other educational institution
   4 ___ Armed Forces
   5 ___ U.S.P.H.S.
   6 ___ Veterans Administration
   7 ___ Non-Federal hospital
   8 ___ Industry
   9 ___ Pharmaceutical company
   10 ___ Research institution
   ___ Other _____ Specify
8. Specialization (Check *one*)
   1 ___ General practice
   2 ___ General practice with special attention to _____ Specialty
   3 ___ Practice limited to _____ Specialty
9. American Board certificate, if any _____ Specify Board
10. Full-time graduate or post-graduate training since 1950:
    (Include only training lasting 6 months or more.)

Type of Training	Type or field	City	State	From		To	
				Mo.	Yr.	Mo.	Yr.
Residency or fellowship							
Other (Specify)							

11. If you have moved your practice to a different town or city since 1950, why did you move?
    1 ___ New community was seeking a physician
    2 ___ Was offered a salaried position
    3 ___ Climate
    4 ___ To get nearer a medical center or hospital
    ___ Other (Specify) _____
12. Remarks _____

Return in enclosed envelope to:
H. G. Weiskotten, M.D.
535 N. Dearborn Street
Chicago 10, Illinois

The Bio-Medical Research Training Program of Duke University

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The scientific revolution in medicine has resulted in an increasing number of young physicians who aspire to careers as sophisticated clinical investigators, capable of utilizing the concepts and skills of the basic sciences. It is abundantly clear that the conventional medical school curriculum, of itself, is inadequate preparation for such a career. In consequence of the pace of development of the biomedical sciences in recent years, it is almost impossible for the student to acquire a scientific experience in depth during his preclinical exposure. Moreover, although the tools and techniques of the biomedical sciences are increasingly complex, many of these (e.g., tracer methodology, paper and column chromatography, ultracentrifugal and electrophoretic separation techniques, ultraviolet spectrophotometry, light, phase, interference, and electron microscopy, tissue culture, and viral immunological techniques, etc.) must be added to the armamentarium of the motivated physician if he is to perform competent studies of relevance to clinical medicine. Unfortunately, there is little opportunity in the standard progression through the medical school curriculum for the interested student to acquire these research skills. To so prepare himself, there is no alternative to the investment of a substantial block of time in additional training. In most instances the student must resort to summer time, an occasional elective quarter, or a "dropout" year in order to secure this experience. Valuable though such investments may be, they usually acquaint the student with a single, restricted area and rarely serve to broaden his general biological understanding or laboratory competence.

As faculties have reviewed medical education in an evolving scientific environment, such measures as the "integrated" curriculum, the 5-year curriculum, the 3-year basic science curriculum, or the expulsion of the clinical departments from the conventional 2-year basic science curriculum have appeared advantageous and have been initiated in a few schools. The educational experiment at Duke University offers to a limited number of medical students and postdoctoral fellows an especially organized academic year of experience in concepts and methods of the biomedical sciences without either delaying the students' graduation from medical school or increasing the cost of their medical education.

After the faculty agreed to undertake such a program, several definitive decisions were made:

1. Block time equivalent to 1 academic year would be required.
2. The program should be housed in its own area. This demanded construction of a new wing on the W. B. Bell Medical Research Building.

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3. A special group of the faculty should be concerned primarily with this program and largely excused from responsibility in the general medical curriculum.
4. Emphasis should be given to those areas of science collectively known as "cell biology," rather than to any one of the specific basic science disciplines as presently structured in most medical schools. Since understanding of the functions of individual cells and subcellular units is essential to all of biology, "cell biology" is a common meeting ground for cytologists, physiologists, biochemists, biophysicists, pharmacologists, immunologists, geneticists, pathologists, microbiologists, etc. Our faculty agreed that advancement of knowledge in this area is a necessary prerequisite to further progress in clinical medicine. Accordingly, the newly created faculty positions were to be filled with individuals trained in various disciplinary areas whose interests merged within the general field of cell biology.

Clearly, with requirements for space, equipment, staff salaries, student stipends and supplies, a rather expensive venture had been projected. It is with pleasure and satisfaction that we acknowledge the generous financial and moral support of the John and Mary R. Markle Foundation, the Commonwealth Fund, the Division of General Medical Sciences of the National Institutes of Health, and the administration of Duke University.

The Faculty.—Seven associate professors have been appointed, each with a record of accomplishment in his chosen area and a vigorous, ongoing research program: a cytologist interested primarily in chromosome structure, a biochemist-tissue culture worker interested in cellular growth and differentiation, a microbial geneticist interested primarily in gene transfer mechanisms, a biophysicist interested primarily in DNA structure and the information coding problem, a physiologist interested in ion transport, an enzymologist interested primarily in lipide syntheses, and a physician-investigator interested in intermediary metabolism and biochemical aspects of genetic disease. Each holds an appointment in the appropriate disciplinary department of the medical school and participates in its normal teaching activities, albeit to a limited degree; but all are housed in the same wing of the W. B. Bell Building, as are the program activities.

This nucleus faculty has primary responsibility for the operation of the program, but the program also draws upon members of the entire university community. In addition to training in biological research, didactic instruction is offered in areas that are generally lacking in the students' previous training. These include mathematics, statistics and statistical theory, and electronics and instrumentation. Instructors for these courses include members of the departments of mathematics, engineering, electronics, and biostatistics. Throughout the year a regular seminar series devoted to various aspects of cell biology is conducted; representatives of the departments of zoology, botany, chemistry, and physics, as well as the basic science departments of the medical school, are invited to participate in this series. In addition, leading scientists from this country and abroad are brought to the campus under the sponsorship of this program. Their visits range from one lecture and a day of discussions to a series of lectures over 2 or 3 weeks and occasional participation in the laboratory exercises. A private office is put at the disposal of the visitor where he may confer, at leisure, with individual or groups of students. In this way, the students gain a sense of participation in the larger expanses of the world of science.

Physical facilities.—Generous physical facilities were provided for a group of fifteen to eighteen students. At the heart of the program is a large, multipurpose laboratory adjacent to which are instrument rooms housing balances, spectrophotometers, isotope counting equipment, refrigerated ultracentrifuges, a glassblowing bench, etc. Closely by are a well equipped darkroom, cold room, incubator room, a fully equipped tissue culture laboratory, a cytology laboratory with all of its appurtenances including an electron microscope for student use, and a stockroom. On the same corridor is a "home room," 25′ × 45′, in which each student has his desk and locker and in which is kept a small reference library of especially selected volumes. The desks are arranged in U-fashion, so that this also serves as the class and seminar room. Near at hand is the library of the department of biochemistry to which the students have free access.

The program.—Medical students and postdoctoral fellows are treated as one group. During the first phase of the program, which requires 12–14 weeks, the group engages in a series of planned exercises closely supervised by the training program faculty. Approximately 1 month is spent in cytology and tissue culture work, 1 month in cellular physiology and biochemistry, and 1 month in genetics and biophysics dealing largely with DNA and RNA. A large emphasis of the program is placed on chromosomes, genes, and biological control mechanisms. No attempt is made completely to cover the entire body of knowledge in any of the disciplines mentioned. Rather, the program is organized as a continuous study of cell biology from different vantage points, while the student is offered an opportunity to live, think, and work with the concepts and methods of the research laboratory. He thus gains first-hand experience with a selected area at the forefront of biology as approached via different disciplinary avenues.

During this introductory phase the student will have learned to use most of the modern tools and instruments of biological work. He will have had experience with light, phase, ultraviolet and interference microscopy, and experience with theory, preparation of material, and operation of the electron microscope. He will have grown cells in tissue culture and studied various aspects of their metabolism; he will have become acquainted with selected techniques of cellular physiology, particularly those dealing with ion transport and nerve conduction; he will have performed experiments in intermediary metabolism and enzymology and have worked intensively on a selected problem, e.g., lipide or nucleotide synthesis; he will have produced and isolated bacterial mutants and have performed genetic crosses, observed transformation and the like; he will have learned to use tracer techniques and to work with paper and column chromatographic methods, to use ultraviolet spectrophotometers and to make tissue extracts and ultracentrifugal separation of subcellular components; he will have isolated DNA, and have studied some of its characteristics. Thus, at the end of this phase he will have had a rather broad but intensive exposure in the biological research laboratory.

In the following 6 months, the student has the opportunity to conduct a small feasible research project with one of the training program faculty or any other member of the university faculty as his mentor. He then works with the advice and supervision of a critical and experienced research worker whose light teaching schedule permits him to give the student an appreciable share of his time. The seminar series is instituted at the end of the introductory period. Each

week, two students present 1-hour seminars dealing with such topics as cytoplasmic inheritance, protein synthesis, enzyme induction and suppression, metabolic controls, etc. In the latter part of the year each student presents a progress report on his own work.

The classes in mathematics, statistics, and electronics also begin at the end of the introductory period. Each course is tailored to meet the needs of biological research workers. Mathematics instruction, which begins with the calculus, presupposes minimal previous mathematical training. Excursions into solid or analytical geometry, advanced algebra or trigonometry, are made when appropriate. Students whose prior mathematical background is deficient are thus kept abreast of the pace; those with more adequate preparation attempt more advanced mathematical work. Statistics and statistical theory stress the handling of data derived from experiments in microbial genetics, isotope counting data, etc., rather than such traditional topics as age-adjusted death rates. The study of electronics entails use of a standard text of medical electronics and includes laboratory experience in which the students build circuits and learn trouble shooting.

Selection and program of medical students.—As appropriate in an honors program, admission is dependent upon recommendation of a committee of the faculty. The only absolute requirements are that the student must have completed his basic science years of medical school training and must participate full-time. In order to qualify, the student must have demonstrated that he is capable of a superior performance when sufficiently motivated. The committee takes into consideration attributes other than academic record, particularly evidence that the student has an alert and inquiring mind, or a research bent. He need not be committed to research; indeed, for the student, the program may well serve as an experiment to determine his aptitudes and inclinations for a research career.

The clinical years of Duke Medical School operate on the quarter system. The training program operates for a standard four-quarter academic year. The student can participate for this entire year without delaying his graduation if two of the clinical quarters of the conventional third year are taken during the summers at the end of the second and of the third, or training program year. He is given credit for one quarter in the training program as a junior elective, and he may convert one quarter of senior medicine or surgery into an elective in the training program as the final quarter of that academic year. In this way, he has, in effect, spent the equivalent of two summers in the training program, utilized one elective quarter already available to him, and a second elective quarter created for him in lieu of one 9-week clinical quarter in the senior year. The student is permitted the option of so converting that final clinical quarter only if he has a strong academic record; he may convert the clinical quarter only in the field in which he plans to take additional clinical training. A student who wishes not to compress his schedule in this fashion has the option of planning his training in any way that appeals to him, including spending the time in the training program as a "dropout" year. A medical student may graduate whenever he has finished the requisite number of quarters. During the time that the student is in the training program he is provided a monthly stipend of $200.

When the student has completed the training program, several options are available to him. He can return to the standard clinical pursuits and complete his medical school training by taking

his four remaining clinical quarters. During this time he may continue the research problem in the training program laboratories as time permits, or simply maintain a personal liaison with his mentor or others of the training program faculty. Or, he may remain longer than the prescribed time in the training program by one or more additional quarters, thus delaying his graduation by the corresponding time. Alternatively, he may enroll in the graduate school in pursuit of a Ph.D. in one of several departments. The graduate school accepts the first 2 years of medical school plus the year in the training program as the equivalent of full "residence" time for the Ph.D. and waives additional formal course and hour requirements on the basis of this experience. The student must then satisfy the specific course requirements of the department in which he wishes to secure the Ph.D., pass the language requirements, and present a satisfactory doctoral dissertation. If he chooses he may return to the medical school at this point and complete his training for the M.D. However, students are encouraged to return to medical school at the end of the training program, earn the M.D., and then enroll in the graduate school. By either mechanism the qualified student may expect to secure both the M.D. and the Ph.D. degrees in 6 years.

An abbreviated 4½-month program was initiated in February, 1960. The first full year of operation was begun in September, 1960, and has now been completed. Although the program is still evolving as to form, composition, and even faculty, it seemed appropriate at this juncture to present a brief progress report on impressions gained from the operation of the program to date.

Experience of medical students.—The Research Training Program is described to the freshman class in one of a series of orientation lectures. In the spring of the second year, interested students visit the training program area, observe and discuss its operation, and acquaint themselves with the ongoing research programs. Thereafter the students are invited to make application for the training program. During the first 2 years of operation 43 of 152 students investigated and seriously considered entering the program. Of these, 22 made formal application; eighteen were accepted. Academically, those accepted ranged from average to the very best.

Performance of medical students in the program.—It is obviously premature to assess the impact of the training program upon the careers of the student participants. Nevertheless, an appraisal of future career plans of students who have spent time in the training program may be useful. The ten students who participated in the first year of the program were graduated from medical school in June, 1961. One of these has elected to pursue a Ph.D. in the department of biology of another university. Of the other nine, five plan to acquire additional research training after a few years of house staff work, to equip them for combined clinical and investigative careers. Four students presently plan to engage exclusively in clinical practice.

The second group of eight students is now in the final year of medical school. One student withdrew from the program at the end of two quarters. Three others returned to clinical work at the end of three quarters; two of these had not taken maximal advantage of the opportunity in the training program, the third was doing highly creditable work, but his previous academic performance did not justify conversion of the clinical quarter into the elective quarter necessary to complete the program. Four students completed the program with high distinction. One has decided to continue

in the biochemistry laboratory for an additional year before returning to medical school. Another plans to pursue a Ph.D. in biophysics following internship. The remaining two plan to pursue further research training after a few years of clinical work. In addition, two of the three students who returned to the clinic after three quarters also plan additional research training at a later date.

Some students have shown ambivalence about spending an academic year in research training before they have had the opportunity to gain a grasp of the clinic. For years they had looked forward to being medical students in contact with patients and they were loathe to defer this experience. Although research interest among this group is genuine, such students nevertheless display anxiety about being in the laboratory while their classmates are learning the clinical arts and skills of the physician. Several students who participated in the first year of the program have since advised that they would have been less restless in the program had they had a prior opportunity to spend 6 months in clinical work. Their appraisal is that, had they gained some of the satisfactions of patient contact and begun to observe the integration of basic science with clinical medicine, they would have immersed themselves in the training program with greater vigor and less uncertainty. Three students who inquired about participation in the first year of the training program decided, at that time, to accelerate their clinical training so as to permit participation in the full program as fourth-year students. However, 1 year later they were so close to finishing medical school that they preferred to go on without interruption. Insertion of the research training program between medical school and the responsibilities of internship seems disadvantageous to all students because of the danger of becoming clinically "rusty" during the interim.

Although a high degree of correlation exists between previous academic attainment and over-all performance in the training program, some notable exceptions were observed. Some students who have been highly successful compulsive learners find the lack of a fiat to master a definite body of knowledge frustrating rather than emancipating. Conversely, some students who previously had earned only average grades have found the freedoms and opportunities of the training program exciting and motivating, and have been outstanding in their performance.

Experience of postdoctoral fellows.—Postdoctoral fellows can combine a year in the training program with a year of fellowship in one of the medical center laboratories. They can begin the fellowship in July, enter the training program in September, and, after the introductory period, return to the laboratory of their fellowship for research. A year in the training program may serve as the first of a several-year investment in postdoctoral research training and, indeed, the training program has been utilized as an opportunity for the clinical departments to engage junior faculty members who spend a year or two in the training program before undertaking their clinical and teaching responsibilities. Finally, the training program appears attractive as a place for senior faculty members to spend a sabbatical year and renew their education. Several such applications have been received, including one from a professor at a neighboring university.

At the postdoctoral level, the program can be considered an unqualified success. The postdoctoral fellow is a more mature, more serious, and more settled individual who has gained a measure of satis-

faction and competence in a clinical area, has assessed various opportunities in the large field of medicine, and has decided to seek training to qualify himself as a clinical investigator or, occasionally, as a full-time worker in a basic science field. Several postdoctoral fellows have arranged to follow the training program year with additional "protected time" which will enable them to develop further as investigators. In some instances, this consists of full-time work in the research laboratory; in others it includes partial resumption of clinical responsibilities but at a pace which will permit an appreciable continuing research investment.

Future plans for the training program.—The most immediate problem is rescheduling of the program to permit participation of our best students with a minimum of personal anxiety. This must be effected without injuring the program for the postdoctoral group which, at present, seems to be making most successful use of this opportunity. Under consideration is the possibility of shifting the introductory phase of the training program to the summer quarter following the third year. Students who plan on entering the training program could then either do so directly following the second year or, if preferred, begin clinical work during the summer immediately following the second year and complete four clinical quarters before entering the training program. They could then spend three or four quarters in the training program, depending upon the option to convert a senior quarter, and follow the training program experience with one or two additional clinical quarters to complete curriculum requirements. This revision of the schedule should meet most of the challenges presented by the students' reactions. It may also offer an advantage for postdoctoral fellows, since this group would then have 9 consecutive uninterrupted months to devote to research following the introductory phase.

Eventual expansion of the program to permit more varied opportunities for participants is under consideration. As the program gains momentum and facilities become available an alternate curriculum in the biology of the intact animal is planned. Such a curriculum would stress experimental pathology, pharmacology, the physiology of organs and tissues, immunology, etc. Until this is feasible it is planned to augment the current program with opportunities in cellular pathology and immunology.

Evaluation of the experiment.—Like many other experiments in medical education, this one is not readily susceptible of evaluation. The program was designed to offer prospective clinical investigators a degree of sophistication in the biomedical sciences which, otherwise, is gained painfully and over many years; to acquaint them with the thought processes of the biological investigator; to offer the opportunity to master a series of diverse techniques; and, hopefully, to liberate them from the slavery to a single technique so common even among successful investigators. Their future success as investigators remains to be determined, but this aspect of the experiment is without controls, and evaluation even 10 or 20 years hence will be difficult at best. Certainly they will have been better prepared for such a career than have their predecessors.

The secondary benefits derived from the operation of the program may yet eclipse its prime purpose. (*a*) The reintroduction of this group of students into the wards and clinics must fan the spark of inquiry and result in perpetual questioning of the validity even of the most routine clinical procedures. (*b*) Most unexpected was utilization of the program by members of our clinical faculty as a means of intellectual "retooling."

(*c*) In a sense, the program is an experiment in an integrated curriculum, and this will be even more so when the second phase, the biology of higher organisms, is implemented. However, integration is attempted *after* completion of the conventional preclinical years of the medical curriculum. With this demonstration of its feasibility, the possibility arises that the lesson may be carried over into the medical curriculum proper —e.g., an initial year devoted to the cardinal aspects of the preclinical disciplines followed by an integrated year, rather than the converse as has occasionally been attempted. (*d*) The unanimous success and enthusiasm of the postdoctoral fellows suggest that the program might serve as a model which might be adopted in providing the formal education owed by a university hospital to its resident staff. This could be accomplished if the time devoted to performance of research and learning research techniques were minimized while the didactic and seminar work is extended through the residency period. In this connection it is important to recognize that those students who participate in much or all of the program and then decide upon full-time careers in general or specialty practice are, nevertheless, rewarded. They have gained a point of view and a sharpened ability to ask questions and think critically; these are among the attributes of a good physician. (*e*) The program should serve, increasingly, as a bridge between the faculty of the medical school and the university. It is hoped that increased awareness of the problems of medicine among physicists, chemists, zoologists, etc., will also arouse their research interests while their special knowledge and skills are transmitted to medical students and faculty. At a time when physics and chemistry permit an ever more rational understanding of the biology of man, when the application of these sciences has rendered meaningless the barriers between the classical biological disciplines, it is fitting that the medical school should truly be "of" the university and not merely "at" the university. In a small way, the Research Training Program has facilitated this process at Duke University.

Teaching of the Preventive Aspects in Genetics

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From the point of view of preventive as well as curative medicine, it is important to realize that man is the product of heredity and of environment, both of which contribute to the growth and development of man as well as to his deterioration by age or sickness.

So far, the most studied etiological and epidemiological aspects of disease are those bearing upon the pathogenic factors present in man's ecological environment, including psychological and sociological factors, though the latter have yet to be scientifically delineated. Moreover, contrary to general belief, no information is yet available that allows us to understand precisely the influences of food habits upon health (44).

Undoubtedly, better knowledge of some of these external factors has already resulted in the adoption of adequate preventive measures against diseases produced by infections, chemical substances, radiation, and other physical factors, including even accidents, when not due to psychological disturbances. Far less known, as yet, is the influence of genetic factors on the origin and the prevention of disease, though genetic factors are indeed vaguely mentioned in the etiology and epidemiology of certain diseases. Epidemiology is understood as "the study of those factors which are responsible for the development of specific diseases in specific groups of individuals" (36).

We are nowadays acquiring better and better control over infectious diseases and over infant mortality; on the other hand, there is an increase of the frequency of diseases which occur in old age, and very little if anything is known regarding their etiology. Thus, it becomes increasingly necessary to study the genetic factors of disease. On one hand, we have to determine which is the quantitative participation of these factors in disease as well as the mechanisms of hereditary transmission, mode of the pathogenic action of genetic factors, and their frequency in a given population; on the other hand, the external influences must be studied to ascertain whether the genetic changes may be ascribed to a known mutagenic agent of the environment and in what way forces from outside may act in disclosing a phenotypic trait or in selecting certain traits in the population.

Man is not always the proper material for genetic research, since it is impossible to submit him to the techniques introduced by Mendel. Nevertheless, it has been possible to study heredity and variation in man by means of special methods, such as the study of pedigrees; comparison of the frequency of a certain trait in a family and in the population as a whole; observations on the frequency of a certain gene in populations; studies in twins; and studies of metaphasic chromosomes in cell cultures treated with colchicine—all fall within the purview of the human geneticist. However, the work of the geneticist is sometimes rendered difficult by the emo-

tional reactions or by certain prejudices on the part of the medical profession or the public. Fortunately, the latter difficulties are diminishing.

It is natural and fully justifiable that the bearer of an undesirable gene will show extreme anxiety on learning of the possibility that he will transmit his own hereditary anomaly to his descendants, whose well-being is often more important to him than his own. It is, therefore, all the more important at the present stage of our knowledge in genetics not to hold certain misconceptions on heredity.

One of the unfounded beliefs is that hereditary diseases or anomalies are unavoidable, acting like an irrepressible alluvion during development. We now know that this concept is not the whole truth, since we have already gained insight into certain factors of the internal or external environment which can modify the effects of an undesirable trait. It suffices to mention diabetes and hemophilia, without referring to other pathogenic conditions, in which modern medicine can lessen or suppress the sufferings of these patients. We have to repeat something which is only common sense but which is often forgotten, viz., that the individual does not inherit a morphological or physiological trait but a certain pattern of reaction, which may vary within a certain range, according to the environmental factors on which phenotypic development always depends. Thus, the same genome may have a different effect according to the prevailing environmental conditions. Observations made in identical twins are of interest in this connection. Although identical twins have the same genes, a disease of genetic origin which appears in one of them does not necessarily appear in the other; or if it does, it may be considerably delayed. This means that certain ecological factors also are necessary for the development of the disease. It is therefore of the greatest interest from the standpoint of preventive medicine to trace these ecological factors which modify the reaction of genetically identical tissues.

One group of anomalies in which environmental factors in general play an important role are the so-called congenital malformations. They are frequently considered to be entirely of genetic origin, but definitive studies of their etiology have only just begun. In fact, a certain percentage of these malformations are primarily of genetic origin, whereas others may be due entirely to exogenous factors. However, in the vast majority of cases the malformation is due to a concurrence of both factors, genetic and environmental. A similar concurrence has been clearly seen in experiments in rats and chickens (34). From the point of view of preventive medicine it is important to point out that certain congential malformations, be they of genetic origin or phenocopies, can be prevented in the offspring by avoidance of irradiation of the gonads of the father or of the pregnant mother. In some instances, teratogenic factors affecting some intrauterine development can be prevented, such as viral infections, particularly rubella, nutritional deficiencies, the use of antifolic acid drugs, and possibly, under certain circumstances, as shown in experimental animals, cortisone and urethan (34). In addition, it is well known that increased parental age may influence the development of the embryo. New possibilities of preventive measures seem to arise from recent work of Russell's (39) who has followed up the frequency of gene defects in the offspring of male rats whose gonads had been irradiated. He stated that the longer the delay between irradiation and copulation, the lower is the percentage of defective offspring,

particularly in those with defects due to chromosomal aberrations. These findings may have application in medicine. It would, for instance, be interesting to know whether in professions with a large exposure to radiation the two sexes are equally at risk. The difference in gametogenesis between males and females might suggest that mutations which occur in the female may be lost in the polar bodies, whereas in males they would survive. Indeed, there is some evidence that the change in sex ratio is about twice as great following the exposure of males to irradiation as in females (14).

Besides the cases already mentioned, in what other way is genetics useful in medicine?

In the first place, genetics can provide us with a list of diseases which depend in a greater or lesser degree upon deleterious genes. When one peruses the textbooks of Gates (22) or Sorsby (41), it is apparent that there are a number of pathological traits transmitted by single genes, which may be dominant, recessive, or co-dominant; these genes may be located in autosomes or sex chromosomes. It is worth stressing that the determination of sex in man depends principally upon the sex chromosomes and not upon a simple balance between genes of femininity located in the X chromosomes and genes of masculinity located in the autosomes, as was believed until recently. Its mechanism is, therefore, similar to that which in plants controls sex in the genus Melandrium (40). The mode of sex determination in man has been made by studying the karyotype of somatic cells in patients affected by sexual abnormalities (17–19).

Simple inheritance is present in cases of malformations (e.g., syndactyly, achondroplasia, etc.), disturbances of metabolism (e.g., diabetes, alcaptonuria, phenylketonuria, etc.), or various other alterations of the phenotype. From a historical point of view one may say that the work of Garrod (21) on inborn errors of metabolism has set a new milestone in genetic research. Garrod showed for the first time that man is an excellent subject for research on biochemical genetics. While Beadle and Tatum produced artificial biochemical mutants, Garrod, in the tradition of the 19th century naturalist, looked for biochemical mutants in nature herself. His great success was due to his fortunate association with the geneticist Bateson and the biochemist Gowland Hopkins.

The scope of Mendelian genetics is not limited to the study of the transmission of pathological traits by one or several genes but also includes individual variations and human evolution, the first being of importance in clinical medicine and the second in epidemiology.

It has been said that there are no such entities as diseases but only patients, or sick people, and that every individual who suffers from a disease presents a unique clinical picture. Constitution is another word for genetic endowment which is part of the binomial heredity environment responsible for the phenotype of each individual. The fact that two patients do not react in the same way to the same pathogenic agent or to the same treatment is due in part to the enormous number of genes contained in each human gamete. Their number may be tens of thousands. When these genes combine at random at the moment of fertilization they may give rise to billions of different genotypes or constitutions; the number of differential genotypes which may originate in a fertilized ovum is greater than the sum total of the atoms in the universe. If only *one* of these genes were mainly responsible for a given trait, its penetrance and expressivity will vary according to

interactions with the remaining genes of the respective genome. The resulting differential genotypes or constitutions will show a major or lesser degree of adaptiveness to their environment.

Normally these genotypes are well integrated, since they are the result of thousands of generations of natural selection; but this "genetic homeostasis" (31) may be upset by the appearance of new genes, by mutations, or chromosomal aberrations. Dramatic cases may originate due to duplication or loss of one of the chromosomes of the karyotype, as has been seen recently in Mongolism, and in cases of intersexuality (3, 17, 18, 28). Further, it is believed that greater susceptibility to carcinogenic agents present in the environment, as well as a greater lability of the somatic cells, may be related to disturbance of genetic homeostasis (24, 30).

The study of variation in human populations is of great interest both in anthropology and medicine. The differential frequency of certain genetic traits in different populations enables us to follow up the relationship between these populations, the origin of races, and the evolution of mankind. However, beyond this, the knowledge of these differential genetic traits helps us to gain information about the significance of the existence of traits in certain racial groups. An illustrative example is provided by the frequency of the gene for sickle-cell anemia in Africa or in populations of African origin, and the almost total absence of the gene for negative Rh in the Japanese. Thus the epidemiology with reference to diseases associated with these genes will vary from one human population to another, and consequently a different approach from preventive medicine will be necessary.

New knowledge which may be useful for application in medicine will also arise from the study of other polymorphic systems. Ford (20) has defined polymorphism as "the occurrence together in the same habitat of two or more discontinuous forms of species in such proportions that the rarest of them cannot be maintained merely by recurrent mutation." Or, in other words: The occurrence of a characteristic frequency of different varieties of a certain hereditary trait in a given population reveals that selective factors are at work.

Among these polymorphic systems one may mention the blood groups (38), the ability to taste phenylthiocarbamide (2), the sensitivity of red blood corpuscles to primaquine (9, 10), the capacity to secrete beta-aminoisobutyric acid in the urine (7), and biochemical polymorphic systems such as abnormal hemoglobins (1), haptoglobins (5, 6), transferrins (23), and other plasma proteins (4).

Besides being responsible for maternal-fetal incompatibilities, a fact which has been extensively studied by Matsunaga (33) in the Japanese population, the genes of the ABO system may also be linked to a higher frequency of certain diseases (11) such as ulcers, gastric cancer, pernicious anemia, etc. Something similar has been observed in connection with the dimorphism related to the capacity to taste thiophenylurea or other compounds which have in common the thiourea group. The fact that this radical is present in various goitrogenic or antithyroid compounds has suggested that there is some relation between the trait for tasting or not tasting thiophenylurea, and thyroid function. Research on this subject has given evidence of a significantly higher incidence of non-tasters in patients suffering from nodular goiter than in normal subjects. On the contrary, no such association was found in the cases of diffuse goiter. It is not known for the moment whether the lack of iodine in certain parts of the world or the presence of goitrogenic com-

pounds in certain diets may modify the frequency of the non-tasting genetic trait (2).

Speculation on the medical importance of the already mentioned polymorphic systems would still be premature; but, for example, one should not be surprised if an association were found between the genetic trait which determines the degree of secretion of beta-aminoisobutyric acid in the urine, and diseases caused by the alteration of the metabolism of the nucleic acids.

Of special medical importance are the studies of new polymorphic systems which may react abnormally to drug administration. Thus, it is already known that barbiturates may be extremely deleterious or even lethal to Europeans and South Africans suffering from porphyria, otherwise a mild genetic disease (15). To cite another example, there are individual and population differences in the rate of inactivation of some antituberculosis drugs (37). These instances seem to be quite frequent and deserve medical attention in this age in which many new therapeutic compounds are being introduced.

As already mentioned, information about the frequency of a given gene in a population is important; it is a valuable aid in the interpretation of human pedigrees. It also allows the establishment, with a certain degree of probability, of whether the parents are homozygous or heterozygous, or whether one or both parents are heterozygous for a pathological trait. This information can modify the genetic prognosis of the disease. Fortunately, today biochemical and other methods are available which render more secure the diagnosis of heterozygosis, in certain cases (26).

The frequency of a given pathological gene in a population depends on many factors. If the population is very small, simple hazard factors may greatly increase the importance of abnormal genes; a high level of frequency of these genes may be maintained by geographic, religious, or social isolation. These relatively small groups have been called "isolates" (42). As may be expected, endogamic and consanguineous marriages are very frequent in these groups, thus providing the geneticist with excellent opportunities for the study of the hereditary transmission of a number of recessive genes which are of low frequency in the general population (27). Other important mechanisms are the appearance of new genes, and natural selection. New genes may appear by mutation or by immigration: Immigration has increased as a result of progress in science and technology in the course of the last decades. Easier transportation and communication have broken up many "isolates" (43). Because of this, defective genes from the isolates or from another type of population may spread into new geographical populations. One dramatic example is given by the migration to other countries of people from Hiroshima and Nagasaki, who may be acting as carriers of deleterious or lethal recessive genes induced by the atomic bombardment. This fact shows that the genetic danger derived from exposure to atomic radiation is a risk that may affect even very distant populations, without mentioning those unfavorable mutations which are produced by fallout of radioactive particles at long distances.

Natural selection may modify a number of genes, either by increasing the mortality rate of the carriers of certain genotypes, or by favoring the differential reproduction of certain classes, or groups, of genotypes (13). Because of the great cultural progress of every kind, the selective forces through death from disease have lost their importance. Nowadays, thanks to the advancement of medicine, carriers of "lethal" genes

have more possibility of reproducing. One must not lose sight of the fact that, from the point of view of natural selection, it is principally by differential reproduction and selection of genes that future generations are provided with the hereditary traits.

Here also arises the question of the quantitative aspect of progeny. The number of offspring may depend to a certain degree on genetic conditions; but in the majority of cases it depends on the decision of the parents, at least in the wealthy and educated classes, who can resort to contraception. Again, their decision is influenced by psychological, educational, religious, social, or economic reasons. Progeny are usually more numerous in the less wealthy classes; but there is the general fact that differential reproduction seems to decrease now that the classes with a lower economic and educational standard are becoming instructed in the use of contraceptives which are more and more accessible to them (43). Birth control will certainly increase when the new contraceptives derived from steroids, which seem to be innocuous and thus far totally void of carcinogenic action (A. Lipschutz, unpublished) become more popular.

It is convenient here to remember that the term "natural selection" may cause confusion. Natural selection has undergone changes in the more advanced societies, and this is why one has come to believe that Darwinian selection, as it acts in nature, is a process that has operated in past human history only when civilized man of our times still lived in primitive conditions, in conditions often even more primitive than those in which some savage tribes live today. However, such a belief is entirely mistaken because, as Dobzhansky (16) says, "(natural) selection takes place in any environment in which bearers of different genotypes fail to transmit their genes to their offspring at the same speed." Dobzhansky adds: "Natural selection is at work in all types of communities, in the illiterate as well as in the educated. What has happened many times and surely will happen again is that natural selection has changed its course and intensity at different times and in different places." Neither should one confuse "natural" selection with "artificial" selection—they are different: by natural selection, we mean selection brought about by the environment, whereas the artificial selection refers to the result of a selection determined by man.

We dealt above with the part differential mortality plays in the mechanism of natural selection; we referred only to death occurring during the reproductive period. The evolutionary process is not subject to influences during the age which is beyond the reproductive period in which medicine has become so greatly interested lately. Selection does not act upon those deleterious genes which become patent beyond the reproductive stage; thus, it is easy to understand why they may continue dormant or even accumulate in the course of generations. This may explain the great number of diseases which affect man beyond the age of 50. Preventive medicine should study what environmental changes could diminish or postpone the effects of deleterious genes linked to these diseases. Some preliminary studies have already shown that changes of diet in the sense of frugality and other changes in the daily habits seem to reduce the incidence of these diseases appearing late in life; these diseases have been called "degenerative" ones by some authors (cardiovascular diseases, chronic rheumatism, etc.).

Besides the dysgenic effects due to modern medicine which allows the reproduction of disadvantageous genotypes, some special environmental factors also may contribute to an accumulation of un-

desirable genes. Such are, for instance, the genes of the Rh system which, though not pathological in themselves, may become so in certain maternal-fetal combinations due to immunological interaction between normal phenotypes.

Among the examples of undesirable genes which accumulate, revealing their major adaptive value we must mention the sickle-cell anemia gene (1); its frequency can reach up to 50 per cent in zones where malignant malaria is endemic. This is owing to the fact that individuals who are heterozygous and who are carriers of an abnormal hemoglobin are more resistant to *Plasmodium falciparum* than normal homozygotes.[1] The unfavorable gene survives under heterozygous conditions whose adaptive or homeostatic value is greater than that of homozygotes (balanced polymorphism).

Another fascinating example is provided by the interactions as present in maternal-fetal incompatibilities due to the Rh and ABO systems. P. Levine (32) has shown that the incompatibilities in the ABO system prevent death of the fetus which would take place on account of incompatibilities in the Rh system. The protective action is due to the fact that the erythrocytes of the Rh-positive fetus are agglutinated and hemolyzed in the uterine sinuses by antibodies derived from the ABO system before sensibilizing the Rh negative mother by impregnating the reticuloendothelial system where the antibodies are produced.

Further applications of genetics of population in preventive medicine bear upon the biological agents which attack man: Those causing infections and infestations and those which act as a reserve of viruses or their vectors. Thus, there are striking differences in the resistance of bacteria to antibiotics. When exposed to antibiotics, the more susceptible individuals are destroyed while the more resistant ones can reproduce—viz., the now well known resistant strains arise. Research by Demerec and his group (8) has brought to light the genetic mechanisms responsible for resistance against different groups of antibiotics; on the basis of their findings a more rational application of various antibiotics has become possible. We now know that resistance to penicillin and other antibiotics is a quantitative trait depending on several polygenes, whereas resistance to streptomycin and isoniazid is a rather qualitative trait conditioned by genetic changes in a single *locus*.

An extremely interesting case which may acquire importance in future application of genetic measures against insect vectors of human diseases is supplied by the work of Knipling and his group (29). They succeeded in eliminating on the Island of Curacao the blue fly (*Callitroga hominivorax*) which is the agent for myasis in cattle. Their technique consisted in irradiation of the males of the blue fly species. Males treated in this way were distributed throughout the Island. When these males were mated with females it became evident that the genotype was considerably altered; the offspring was sterile. In other words, irradiation of the male proved in the long run lethal for the reproductive capacity of this species.

Many insect vectors are resistant to insecticides, which are, in some cases, chemical substances dangerous to man. It is important, therefore, to investigate those genetic mechanisms which might effect survival or the reproductive capacity of these harmful insects.

We have already mentioned that mutations have become more numerous in our atomic age. The same occurs as a result of progress of modern medicine, which enables individuals who otherwise would

[1] L. S. Penrose, Genetical Analysis in Man. Ciba Foundation Symposium on Biochemistry of Human Genetics, pp. 9-22, London: J. & A. Churchill, Ltd., 1959.

be eliminated to reproduce. From this situation new socio-medical problems of increasing complexity have arisen. It is possible that in the distant future progress in the study of the chemistry of hereditary matter or of the biochemical mechanisms active in abnormal genes will make it possible to apply suitable measures to control these abnormal genes or to suppress their effects on the phenotype. For the moment the only thing to recommend is genetic counseling, which may be useful in diminishing the sufferings of individual families affected by these genes.

Almost all geneticists nowadays agree that it is not possible to resort again to the enforced eugenics of the past. This kind of eugenics has fallen in discredit because of misuse and misinformation. It may be profoundly harmful from a psychological as well as social point of view. Aside from the fact that in the name of eugenics the most abominable genocides have been committed, and that individuals with hereditary anomalies have been submitted to most painful measures including surgery, there was not attained the elimination of certain traits which depend on recessive genes or complex genotypes.

Here, as it may be expected, we shall consider only genes of medical importance, without referring to those which condition intelligence, character, or other aptitudes of psychological or social significance — imperfectly known problems whose study would require the collaboration of different specialists.

For the application of a modern plan of eugenics, cooperation between the hospital and the Public Health Service is necessary. To the latter is incumbent the prevention of genetic accidents caused by medical or industrial misuse of radiations and chemical substances both of which may produce mutations. Enforcement of adequate regulations and frequent inspections are the best procedure by which this may be done. Likewise, it is incumbent on the Health Service to educate the public and the physicians as to the dangers of radiation. The Public Health Service must also be in charge of research on drugs which might attenuate the mutagenic effects of radiations. Some such drugs have already been discovered (25) and might possibly find application in medicine in patients who unavoidably have to be submitted to x-ray examinations. It should be remembered that these examinations are more harmful at the reproductive or prereproductive age. Young individuals are more sensitive than older ones, because they possess a greater number of cells in mitosis which are more sensitive to mutagenic agents. The same may be said with regard to the frequency of somatic mutations.

We shall avoid discussing the dangers of the use of atomic energy for military purposes which have been studied and analyzed in a great many publications.

The hospital may contribute to practical eugenics by special genetic clinical departments under the direction of a physician specialized in genetics, or by a geneticist in association with a general practitioner. The genetic clinical department could lend its attention to those practical problems of medical genetics which have been referred to by ward patients or out-patients seeking genetic advice.

The problems which might present themselves to clinical departments of this kind are varied and refer to different pathological conditions or anomalies. Clarke Fraser (12), who has made a survey among medical geneticists, classifies these problems into the following categories:

"The most frequent type of questions seems to deal with whether parents should have a baby; the problem arising either because they already have a child with some disease of presumed or actual

family tendency, or because some such disease was present in one of the parents themselves or in some distant relative. The next most frequent type of question deals with the desirability of a contemplated marriage, either because of consanguinity or some genetic disease in one of the family involved. Some cases are referred for an opinion as to genetic suitability of an adoption procedure, some for an interpretation of the cause of a child's illness or defect (apart from eugenic consideration), some for an opinion as to the chances of a sibling or other relative of an affected person becoming affected in the future, and a few for another reason "such as paternity disputes, zygosity diagnosis in twins, dermatoglyphic diagnosis of Mongolism, and diagnosis of rare, obscure diseases."

The diseases seen by medical geneticists may vary greatly. In the inquiry of Clarke Fraser, the first place is taken by congenital malformations; then followed neuropsychiatric affections, cases of consanguinity, Mongolism, and conditions of maternal-fetal Rh incompatibilities. Fraser mentions also hemorrhagic diathesis and a series of other diseases, rare but well defined from a genetic point of view.

It falls on the medical geneticists to inform the couple who consults him about the statistical probabilities of having a defective child, taking as a standard the probabilities with couples in the population in general. Certainly he should inform the couple with tact and mature human comprehension. However, the final decision to take the advice of the specialist must be left to the judgment of the parents themselves. Sometimes, indeed, when the couple is of a certain culture, mentally balanced and in a good economic position, they may be capable of taking upon themselves the risk and the decision. However, in other cases the couple, or one or the other partner, who seeks advice needs the guidance of the medical consultant or psychiatric help, especially when psychic difficulties are involved. It should never be forgotten that these medical-genetic conditions are associated with severe anxieties which should be relieved if possible.

On what does the expert in heredity base his so-called statistical probabilities in a given case? All will depend on the mechanism of transmission of the respective genetic disease. This mechanism has to be established by a careful study of the family history, including tests to detect heterozygotes, by establishing the frequency of the gene in the population, etc. With all these data at hand a prediction may be made. When the mechanism remains unknown there is no other alternative but to recur to the empirical risk figures established for certain diseases. In other cases such as Mongolism and various congenital conditions, the risk increases with the age of the mother and certain other environmental influences.

Pathologic conditions which are generally associated with the post-reproductive age, and whose etiology is multiple and complex, are not classified as simple genetic diseases. However, though these diseases so far have not been studied in a satisfactory manner, genes seem to have some etiological importance. If geneticists are able to assess the hereditary factors in these cases, then they could identify the susceptible individuals and refer them promptly to the medical practitioner; in this way help may be afforded in time (34).

The review of facts and possibilities in relation to prevention of diseases, briefly summarized in this article, stresses the importance of teaching human genetics in medical schools. This is perhaps more necessary for the general practitioner than for the specialist. As Herndon (35) says: "The most fun-

damental answer may be that an understanding of genetics will contribute to the physician's basic understanding of the etiology of disease. Genetics provides the scientific basis for the concepts of individuality and variation within the species, and hence for certain differences in susceptibility to disease and for some types of hyper-reaction. An understanding of genetics contributes much to an understanding of the complex interactions that exist between man and his environment." And we should add: He will be more prepared to cope with the new medical and genetic problems of the atomic age.

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Institutes for Physicians and Nurses in the Care of Premature Infants

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During the past 12 years a special educational program designed to raise the standards for care of prematurely born infants has been conducted at The New York Hospital-Cornell Medical Center. This report describes the project, its objectives, organization, and curriculum. A previous report in the American literature was oriented mainly toward the public health aspects and covered only the first 5 years (2). A more recent report appeared in the Italian literature (1).

Sponsorship and organization of the program.—Cooperation between governmental and private agencies made these Premature Institutes possible. Since their inception in 1949–1950, the United States Children's Bureau has made annual grants to the New York State Department of Health which cover the budgets needed to conduct these Institutes, as prepared yearly by The New York Hospital-Cornell Medical Center (Department of Pediatrics). Representatives of both these agencies, as well as members of the New York City Department of Health, have, in addition, participated directly by joining the faculty of the Institutes, and by recommending applicants for admission from the city, state, and nation.

The Institutes are set up as a separate postgraduate program under the direct supervision of the Pediatrician-in-Chief. He appoints one medical and one nursing director, who jointly prepare curricula, arrange dates, select lectures, and accept candidates.

The faculty comprises not only members of the Department of Pediatrics of The New York Hospital-Cornell Medical Center, but also lecturers from other departments of the Center, as well as staff members from other institutions in the New York City area, the Children's Bureau, and the New York State Department of Health. A number of the sessions are conducted in the nurseries of other Centers in the area. This wide choice ensures a discriminating faculty and a high caliber of teaching, and is evidence of the cooperative nature of this venture.

A unique feature of the Institute is the selection of physician-nurse teams as participating members, rather than acceptance of individual applicants. This is done because years of experience in the Premature Center of our own institution have shown that optimal premature care depends on the close cooperation of physician and nurse. No other patient requires as much nursing care as the tiny premature infant who cannot suck or feed, is unable to control his

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own body temperature, and frequently exhibits extreme respiratory distress. His survival depends on watchful management—management which, however, must constantly change and improve as new advances are made in the knowledge of the basic physiology and biochemistry of these infants. Obvious advantages accrue in simultaneously training the two team members in both the basic sciences and the clinical skills involved in the management of the premature. From a few sessions peculiarly oriented toward the nurse, the physicians gain new insights and respect for the many problems, as, for example, in maintenance of the new incubators. Similarly, a nurse exposed to some of the recent biochemical, enzymatic, or genetic advances may then better appreciate why, for example, certain routines which previously she had regarded as purely nursing care, may require change.

Participating teams are selected from applicants representing major teaching hospitals, as well as smaller hospitals attempting to institute or improve their program of premature care. Many public health officials chiefly responsible for supervision and organization rather than for teaching and direct patient care have also attended. Each of the team members receives a stipend to defray part of the cost of living expenses while attending the Institutes. A limited number of physicians and nurses from foreign countries are welcomed as observers; they greatly enhance the program through an exchange of views and experiences and a discussion of problems applicable on an international rather than a purely local level. Observers receive no stipend but attend all the combined sessions with participating team members. In addition, a small number of physicians and nurses from the United States have been accepted as observers. These usually include full-time salaried members of federal, state, or local agencies, and occasionally a physician or nurse from a premature service of a hospital where a team had attended previously but where one member since then has left the institution.

Content and development of the program.—A condensed version of the program is presented in Table 1. During this 2-week period, approximately 72 hours of lectures, demonstrations, and discussions are given, and these sessions are attended by both members of the team. The subjects presented are grouped around broad topics and can be subdivided into four major phases.

The first phase, lasting 3 days (30 per cent of total time), serves as an introduction to the problem of prematurity with major emphasis on the physiologic handicaps which require special feeding, as well as on resuscitation measures. Attention is given to the influence of detailed metabolic and laboratory data on more recent concepts of nutritive requirements, not only in the infant but also in the pregnant mother. The basic physiology of causes and thus possible treatment of the respiratory distress syndrome is also brought into focus at the outset of the course.

The second phase, also lasting 3 days (30 per cent of total time), is an exploration of certain medical problems that the premature infant may encounter while in the unit. The subjects covered are outlined in Table 1. Emphasis is always placed on the ways in which a premature infant differs from other children and from adults with similar conditions—e.g., how certain drugs very effective in the treatment of particular diseases might kill a premature infant owing to lack of specific enzymatic systems. Similarly, pathologic findings are correlated with clinical data.

The third phase of the program, again lasting 3 days (30 per cent of total

TABLE 1

CONDENSED VERSION OF PROGRAM FOR THE FIRST TWO WEEKS OF A CURRENT PREMATURE INSTITUTE

Day	Subject	Time (hours)
	Phase I:	
1	Introduction and Background	2 ½
	a) Orientation and Physiologic Handicaps	2
	b) Clinicopathologic Conference	1
2	Neonatal Aspects of Prematurity	
	a) Obstetric Aspects and Prevention of Prematurity	2
	b) Nursery Care and Incubator Demonstration	2
	c) Pulmonary Physiology and Resuscitation	2
3	Feeding	
	a) Physiologic Handicaps	1
	b) Feeding of Premature Infants—1) Medical Aspects	2
	2) Nursing Aspects	1
	c) Nutrition in Pregnancy	1
	Phase II:	
4 and 5	Special Medical Problems of the Premature	
	a) Neurologic problems	1
	b) Gastrointestinal Problems	2
	c) Cardiovascular Problems	1
	d) Renal Physiology	2
	e) Fluid and Electrolyte Therapy	1 ½
	f) Hematologic Problems	2
	g) Therapy of Infectious Conditions	2
	h) Use of Infant Resuscitator	½
6	Special Pathologic Problems	
	a) Pathology	2
	b) Miscellaneous Problems (Babies of Diabetic Mothers, Metabolic Problems, Jaundice, etc.)	1 ½
	Pediatric-Obstetric Conference	1 ½
	Premature Nursery Cases	1 ½
	Phase III:	
7	Field Trip and Comparison of Premature Centers in a Municipal and Voluntary Hospital	5
	Planning, Constructing, and Reconstructing a Premature Unit	2 ½
8	Follow-Up Studies and Care	
	a) Prematures Under 1,000 Grams	1
	b) Developmental Problems	1
	c) Ophthalmologic Problems	1
	d) Emotional Problems between Parents and Children	1
	e) Demonstration of Premature Follow-Up Clinic	1
9	Practical Aspects of Administration of a Premature Unit	
	a) Management of a Premature Unit	1
	b) Special Problems in a Premature Unit	1
	c) Premature Nursery Cases	1
	Public Health Panel on Prematurity	2
	Phase IV:	
10	Final Sessions	
	a) Selected Premature Case Histories	2
	b) Evaluation Conference	1 ½
	c) Individual Conferences	1

In addition to above, 1 hour daily is allotted for lunch and ½ hour daily for coffee breaks. Also, 1 hour daily is allotted for General Pediatric Rounds or Conferences.

time), deals with broad public health and management problems. Two different institutions are visited. Problems peculiar to each in terms of teaching, management, patient care, research, staffing, follow-up, and construction are stressed. Because these differences raise questions, a public health panel discussion concludes this part of the program and integrates information.

The fourth phase of the program, lasting 1 day (10 per cent of total time), serves as a review. Interesting cases, current as well as collected over many years, are presented to the group to illustrate points previously covered.

The nurses remain for an additional period of 2 weeks to undergo practical training and experience in the premature nursery. While working directly with patients, they apply principles they have learned in earlier sessions. During this period they also attend demonstrations, such as breast feeding sessions and formula preparation classes which are conducted for the mothers on the obstetric service of The New York Hospital-Cornell Medical Center, in addition to well baby and premature follow-up clinics.

Effectiveness of Institutes.—The program of the Institutes has undergone various changes over the past 12 years. When indicated, a major modification of curriculum has been introduced because of changing needs or important advances in knowledge regarding prematurely born infants. Relatively minor but numerous changes have resulted from comments and suggestions solicited from the participating physicians and nurses. At the end of the first 2 weeks and again after the second 2 weeks, each participant is asked to evaluate the worth of each session attended in terms of appropriateness of material, manner of presentation, need for additional material, or changes in emphasis concerning time or orientation. Continuing revisions in program result from these confidential evaluations so that an individual who had attended the first Premature Institute would not easily recognize the program as it is conducted today. One notable example of program revision is the present abbreviated review of retrolental fibroplasia.

The evaluation conferences also sum up the feelings of the participants. Although not all agree that the program is 100 per cent effective as far as individual needs are concerned, nearly every member is enthusiastic about the course, its organization, presentation, and quality of instruction. During the past 6 years, the two senior authors have personally interrogated about 400 participants. Detailed reports of their comments are available. Not a single adverse comment about the over-all impression was elicited. The few adverse comments dealt with minutiae of personnel and organization which were readily corrected. When the public health content of the course was severely criticized by a number of participating teams, national as well as state public health officials were invited to participate as observers for an entire Institute. As a result of this, the public health portion of the program was completely reorganized from individual lectures to informal group seminars jointly conducted by representatives from local, state, and national public health departments. The new plan has been well received during this past year.

During the past 3 years more than 50 letters have been received from former Institute members who emphasize how valuable the course has been to them. Recently, one of the authors (Dr. S. Z. Levine) visited a Premature Center in the hospital of Calvo McKenna at Santiago in Chile and found it to be based entirely on material presented at the Institutes.

TABLE 2

DISTRIBUTION OF TEAMS FROM THE UNITED STATES

State	No.	Teams	Physicians	Nurses	Observer physicians	Observer nurses
Alabama		2	2	2		
California		3	3	2		
Connecticut		10	9	10		
Delaware		3	3	2		
Florida		18	18	18		1
Georgia		10	9	11		
Hawaii		2	1	2		
Idaho		1	1	1		
Illinois		12	12	11	1	
Indiana		2	2	2		
Iowa		1	1	1		
Kentucky		11	9	11	1	2
Maine		8	8	8		
Maryland		5	5	5		
Massachusetts		14	13	13		2
Michigan		3	3	3		1
Minnesota		5	5	5		
Missouri		7	6	7	1	
Nebraska		1	1	1		
New Hampshire		4	4	4		
New Jersey		8	8	7		
New York City		47	43	45	12	16
New York State		63	52	62	6	8
North Carolina		7	7	7		
North Dakota		3	3	3		
Ohio		5	5	5		
Oklahoma		3	2	3		
Oregon		1	1	1		
Pennsylvania		15	14	15		
Puerto Rico		7	7	7		
South Carolina		10	9	10		1
Tennessee		1	1	1		
Texas		1	1	1		
Vermont		3	3	3		
Virginia		7	6	5		
Virgin Islands		1	1	1		
Washington		4	3	2		
Washington, D.C.		2	2	2		3
West Virginia		3	3	3		1
Wisconsin		3	3	3		
Totals:	40	316	289	305	21	35
United States Army		8	8	8		
United States Air Force		1	1	1		
U.S. Public Health Service		2	1	2	1	1
New York State PHS					1	2
Totals		11	10	11	2	3
GRAND TOTALS		327	299	316	23	38

Another criterion of effectiveness of the Institutes is the number of series that have been held. When originally planned, it was felt that a few sessions for 1 or 2 years would meet the demand for such a venture. However, this has not been the case. Four or five Institutes have been conducted annually for each series of the past 12 years. To date, 55 Institutes have met. Representatives from the domestic United States, its territories, and governmental services have totaled 327 teams, comprising 299 physicians and 316 nurses from 40 states and territories, as shown in Table 2.

In Table 2, discrepancies in numbers of physicians and nurses participating as teams are explained by occasional last-minute unavoidable absence of one registered team member, by the teaming of one physician with two nurses when the doctor is director of premature care at two community hospitals, or by admission of a new hospital staff member replacing a physician or a nurse of a team who had attended one of the earlier Institutes.

In Table 3 are shown the countries of origin and numbers of foreign physicians and nurses who have participated as observers at the Institutes.

Instead of the demand diminishing, more and more applications are received so that at present a 1-year advance registration is nearly always necessary. As we cannot meet all the demands, other Premature Institutes based on this one are now in the planning stage in California.

Summary and future of the Institutes.—The objectives, organization, and program content of the Institutes in the Care of Premature Infants conducted over a 12-year period at The New York Hospital-Cornell Medical Center are given. Summaries of numbers of individuals participating are also presented.

The Institutes have served a useful purpose in spreading information on premature care, and it is planned to continue them in essentially their present form, and with the same guiding principles, as long as the demand for participation continues and the sponsoring agencies continue their support.

TABLE 3

FOREIGN OBSERVERS

Country	No.	Physicians	Nurses
Argentina		2	
Belgium			1
Brazil		3	1
Canada		2	3
Chile		2	2
Colombia		1	
Denmark		1	
Dominican Republic		1	
Egypt		1	
England		1	4
France		3	2
Greece		1	
Guatemala			1
India		10	
Indonesia		2	
Iraq		1	
Israel		2	
Italy		3	
Japan		2	1
Korea		1	
Pakistan		1	
Peru		1	
Republic of the Philippines		8	
Scotland		1	
South Africa		1	
Spain		1	
Surinam		1	
Sweden		1	
Thailand		2	
Uruguay		2	
TOTALS:	30	58	15

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U. S. Medical School Alumni

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A total of 233 medical schools in the United States (and Puerto Rico) had graduates living in mid-1959. The currently active 4-year schools number 78, into which 61 former schools have been merged, whereas the balance of the schools have become extinct over the years. Schools with their first graduating class in 1959 or later are excluded from this study.

The number of living graduates of all U.S. medical schools was about 220,500, not including the June, 1959, graduating classes. About 210,500 physicians were graduates of currently active schools; of these, about 208,000 were living in the United States, Puerto Rico, and the Territories (or in Federal service regardless of location). This information was tabulated from the individual physician punch cards provided to the Public Health Service by the American Medical Association.

Of the physicians located in the United States, Puerto Rico, and the Territories in mid-1959, the currently active medical schools have supplied 87 per cent—93 per cent of those in Federal service and 87 per cent of the non-Federal physicians, as indicated by the figures in Table 1.

Graduates per school.—For each of the 78 active medical schools, the number of graduates living in the United States, Puerto Rico, and the Territories is shown in the accompanying table. The range is from 6,215 at the Jefferson Medical College of Pennsylvania, where classes have been graduated annually since 1826, to 66 at the University of Mississippi through its recently developed new program. As would be expected, the eleven schools established since 1940 or expanded from 2-year to 4-year programs, indicated by an asterisk in Table 2, have the smallest numbers of total graduates. Among the four other schools with fewer than 1,500 graduates prior to 1959 are three that have had small classes graduated annually for more than a century,—namely, Albany Medical College, Woman's Medical College, and the University of Vermont.

The schools with the largest numbers of total graduates, ranked in that order, are: Jefferson Medical College, University of Illinois, University of Pennsylvania, Harvard Medical School, Northwestern University, New York University, and University of Michigan. These seven schools have provided nearly one-fifth of the national physician supply.

Graduates in private practice.—About 141,000, or two-thirds, of the graduates are in private practice. Those in private practice include 71,000 engaged in full-time specialization and 70,000 in general practice or part-time specialization. Those not in private practice are in hospital service (interns, residents, and other full-time staff), in other medical

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TABLE 1

Medical school	All physicians	Federal physicians	Non-federal physicians
Total graduates	238,011	17,519	220,492
U.S. school graduates:	217,703	16,540	201,163
Active schools	208,006	16,329	191,677
Extinct schools	9,697	211	9,486
Not U.S. school graduates	20,308	979	19,329

practice (teaching, research, administration, and public health), or not in medical practice (retired or for other reasons).

Half of the schools show that 68 per cent or more of their graduates are in private practice. The schools with the highest proportions are Stritch, Creighton, Rochester, Hahnemann, and Meharry.

The schools with markedly low proportions of graduates in private practice are usually those with their first graduating classes since 1950 and, hence, relatively large numbers are still in hospital training programs. Among the older schools with low proportions of graduates in private practice are Yale, University of Chicago, Johns Hopkins, Harvard, Syracuse, and Woman's. These are the schools which have high proportions of their graduates engaged in hospital service or other forms of medical practice.

Full-time specialists.—The active medical schools have graduated a total of nearly 90,000 physicians classified as full-time specialists. About 80 per cent of these specialists are engaged in private practice, the balance being in hospital service or other medical activities.

Half of the schools show that 42 per cent or more of their graduates are engaged in full-time specialization. The schools with the highest proportions are Yale, Johns Hopkins, Harvard, Columbia, Cornell, New York University, and Rochester.

As noted for private practice, the more recently established schools have relatively few of their graduates already classified as full-time specialists. Among the older schools with low proportions of specialists are Medical Evangelists, Howard, Chicago Medical, Stritch, Woman's, Tennessee, and Meharry.

Woman's Medical College has relatively few full-time specialists when only a small proportion of all graduates are engaged in private practice. It is more usual to have a high proportion of specialists among the schools with low proportions of graduates in private practice.

Physician's location.—Nearly half (47 per cent) of the physicians, excluding those in Federal service, are located in the same state where they attended medical school. About 16 per cent are in adjacent states, while 37 per cent are farther away.

Half of the schools show that 48 per cent or more of their graduates establish themselves in the same state as their alma mater. The schools with the highest proportions (70 per cent or more) of graduates so located are University of California at Los Angeles, Southern California, Stanford, University of California at San Francisco, Wayne, Buffalo, Pittsburgh, Texas Southwestern, Texas Medical, and Baylor. Three-fourths of the physicians graduated from all medical schools in California and in Texas are located in those same states.

Meharry Medical College heads the list of schools with low proportions of their graduates located in the same state. Only 8 per cent of the Meharry gradu-

TABLE 2

U.S. Medical School Graduates Living in the United States, Puerto Rico, and the Territories in 1959, Classified according to Type of Practice, Specialization, and Location

State	Name of medical school	Total number of living graduates	Private practitioners		Full-time specialists		Non-federal physicians		
			Number	Per cent	Number	Per cent	Total	Located in same state as school	
								Number	Per cent
	All 78 schools	208,006	141,005	68	89,802	43	191,677	90,148	47
Ala.	*Medical College of Alabama	809	445	55	160	20	696	475	68
Ark.	University of Arkansas	2,045	1,410	69	672	33	1,832	845	46
Calif.	College of Medical Evangelists	2,729	1,964	72	796	29	2,587	1,613	62
	*University of California, L.A.	138	10	7	5	4	110	87	79
	University of Southern Calif.	1,634	1,094	67	705	43	1,527	1,375	90
	Stanford University	2,022	1,321	65	1,011	50	1,891	1,594	84
	University of California, S.F.	2,463	1,532	62	1,215	49	2,245	1,962	87
Colo.	University of Colorado	2,024	1,337	66	844	42	1,792	815	45
Conn.	Yale University	1,960	1,109	57	1,084	55	1,792	492	27
D.C.	Georgetown University	3,167	2,243	71	1,326	42	2,904	425	15
	George Washington University	2,560	1,635	64	1,128	44	2,260	512	23
	Howard University	1,877	1,367	73	362	19	1,760	287	16
Fla.	*University of Miami	117	10	9	1	1	98	49	50
Ga.	Emory University	2,524	1,796	71	1,105	44	2,323	1,036	45
	Medical College of Georgia	1,861	1,270	68	664	36	1,692	1,050	62
Ill.	Chicago Medical School	1,939	1,371	71	432	22	1,820	989	54
	Northwestern University	5,437	3,867	71	2,667	49	5,070	1,383	27
	Stritch School—Loyola Univ.	3,847	2,892	75	1,229	32	3,621	1,672	46
	University of Chicago	1,419	710	50	719	51	1,283	308	24
	University of Illinois	5,876	4,212	72	2,571	44	5,423	2,699	50
Ind.	Indiana University	4,131	2,912	70	1,597	39	3,844	2,368	62
Iowa	State University of Iowa	3,258	2,219	68	1,314	40	2,980	1,229	41
Kans.	University of Kansas	2,708	1,841	68	1,050	39	2,462	989	40
Ky.	University of Louisville	3,899	2,847	73	1,358	35	3,666	1,419	39
La.	Louisiana State University	1,951	1,304	67	674	35	1,742	1,079	62
	Tulane University	4,627	3,306	71	2,133	46	4,279	1,297	30
Md.	Johns Hopkins University	3,353	1,905	57	2,069	62	3,165	577	18
	University of Maryland	4,288	3,094	72	1,844	43	4,016	1,328	33
Mass.	Boston University	2,071	1,298	63	923	45	1,906	821	43
	Harvard Medical School	5,589	3,237	58	3,458	62	5,133	1,593	31
	Tufts University	4,265	3,061	72	1,948	46	3,958	2,056	52
Mich.	University of Michigan	4,999	3,217	64	2,363	47	4,639	2,238	48
	Wayne State University	2,400	1,727	72	977	41	2,277	1,754	77
Minn.	University of Minnesota	4,538	3,104	68	1,990	44	4,165	2,173	52
Miss.	*University of Mississippi	66	6	9	1	2	54	22	41
Mo.	*University of Missouri	77	14	18	1	1	63	18	29

	St. Louis University								
	Washington University	3,554	2,393	67	1,858	52	3,254	1,094	34
Neb.	Creighton University	2,269	1,681	74	768	34	2,094	329	16
	University of Nebraska	2,772	1,973	71	1,153	42	2,514	748	30
N.Y.	Albany Medical College	1,489	991	67	616	41	1,358	908	67
	University of Buffalo	2,614	1,897	73	1,205	46	2,464	1,758	71
	Columbia University	4,611	2,955	64	2,714	59	4,325	2,184	50
	Cornell University	2,879	1,851	64	1,597	55	2,679	1,337	50
	New York Medical College	3,144	2,224	71	1,288	41	2,920	1,672	57
	New York University	5,097	3,650	72	2,782	55	4,741	2,922	62
	State University of New York, New York City	4,197	2,943	70	1,985	47	3,858	2,564	66
	University of Rochester	1,578	1,252	79	867	55	1,436	549	38
	State University of New York, Syracuse	1,845	865	47	847	46	1,701	1,155	68
N.C.	*University of North Carolina	296	61	21	14	5	214	121	57
	Duke University	1,684	1,018	60	894	53	1,486	424	29
	*Bowman Gray School, Wake Forest College	725	401	55	222	31	626	330	53
Ohio	University of Cincinnati	2,934	2,002	68	1,356	46	2,728	1,486	54
	Western Reserve University	2,654	1,780	67	1,320	50	2,495	1,391	56
	Ohio State University	3,290	2,283	69	1,222	37	3,039	2,091	69
Okla.	University of Oklahoma	2,057	1,422	69	749	36	1,848	1,002	54
Ore.	University of Oregon	2,116	1,468	69	896	42	1,929	908	47
Penn.	Hahnemann Medical College	3,593	2,671	74	1,327	37	3,354	1,592	47
	Jefferson Medical College	6,215	4,466	72	2,772	45	5,808	2,697	46
	Temple University	3,606	2,534	70	1,487	41	3,305	1,674	51
	University of Pennsylvania	5,685	3,739	66	3,053	54	5,319	2,340	44
	Woman's Medical College	1,210	623	51	377	31	1,190	399	34
	University of Pittsburgh	2,728	1,837	67	1,165	43	2,500	1,794	72
P.R.	*University of Puerto Rico	209	35	17	4	2	156	98	63
S.C.	Medical College of S.C.	1,718	1,151	67	622	36	1,579	1,050	66
Tenn.	University of Tennessee	4,409	3,023	69	1,396	32	4,047	1,524	38
	Meharry Medical College	1,929	1,492	77	297	15	1,833	146	8
	Vanderbilt University	2,149	1,451	68	1,136	53	1,976	584	30
Tex.	*University of Texas Southwestern Medical School	1,104	622	56	269	24	942	708	75
	University of Texas Medical Branch	3,384	2,330	69	1,339	40	3,041	2,433	80
	Baylor University	2,412	1,665	69	907	38	2,202	1,583	72
Utah	*University of Utah	636	319	50	201	32	532	219	41
Vt.	University of Vermont	1,483	989	67	613	41	1,370	311	23
Va.	University of Virginia	2,222	1,440	65	1,179	53	2,018	771	38
	Medical College of Virginia	3,408	2,374	70	1,329	39	3,161	1,340	42
Wash.	*University of Washington	533	191	36	67	13	408	223	55
Wis.	University of Wisconsin	1,814	1,127	62	799	44	1,648	773	47
	Marquette University	2,835	2,019	71	980	35	2,607	1,274	49

* Established since 1940 or expanded from 2-year to 4-year program.

ates are in Tennessee; 26 per cent are in adjacent states, and 66 per cent are farther away. All three schools in the District of Columbia have relatively few of their graduates located in the District. This is to be expected since city lines have been used in place of state boundaries for the analysis. At least two-thirds of their graduates are in states once removed from the District. The University of Chicago, Johns Hopkins, and Creighton also have their graduates widely dispersed. On the other hand, some of the schools have graduates in large proportions (24 to 34 per cent) in adjacent states, namely, Yale, Tulane, Woman's, Vanderbilt, and Vermont.

The extent to which the individual states rely on facilities within their own boundaries, in contrast to those in adjacent or other states, varies considerably. A total of 21 states and the District of Columbia have obtained more than half of their physician supply from medical schools within their borders. Five states have obtained more than half of their physicians from medical schools in adjacent states. Another 20 states have obtained more than half of their physicians from schools located neither in their state nor in an adjacent state. The remaining four states do not fall into any of these patterns.

Year of graduation.—Location, type of practice, and specialization are all a function of how long the physician has been out of medical school. Basic data for each of the 78 active 4-year medical schools on the number of living graduates according to year of graduation are available in Health Manpower Source Book 11 (Public Health Service Publication No. 263, Section 11). Single free copies of this 319-page report by Stewart and Pennell may be obtained from the Public Health Service.

Medical Education Forum

Editorials

A LONG COLD WINTER

As this Editorial is written, it is clear that the chances for Congressional enactment of the program for Federal Aid to Medical Education are exceedingly dim. We have been bombed out by Khrushchev's threats over Berlin, his satellites, missiles, and astronauts.

Many medical schools had planned bold new programs based on new faculty and new facilities financed in part by federal funds. The urgent need for additional loan funds for students seemed to be capable of solution through federal support. Now the chances of initiating such programs are remote.

The A.A.M.C. is often criticized (and envied) by educators from other fields because of our effective role in establishing the urgent need for federal support. Although the chances are dim, we can still pull the chestnuts out of the fire if the deans and faculty members express their needs to their congressional representatives. We have leaned too heavily on our very effective presentations in Washington and have failed at the grass roots level.

Otherwise we face a long, cold winter.

HOW TO WIN FRIENDS

It is pleasant to acknowledge the receipt of the Proceedings of The Fifth Annual Conference for Foreign Medical Scholars which was held at the University of Rochester in June, 1961. With financial support from the China Medical Board and the co-sponsorship of organizations active in international health, these conferences, which began in 1957, have become an important platform for the discussion of problems and programs in medical education in the wider world.

The Proceedings of The Fifth Annual Conference includes a number of excellent papers on subjects ranging from "The Development of Medical Education in the United States" by Robert A. Moore to "Decision-Making in Our American Medical Centers" by Joseph C. Hinsey.

Anyone who has been fortunate enough to attend one of the conferences is well aware that the printed reports, valuable as they may be, cannot catch the real spirit and vital force in the meetings.

The contacts between faculty members concerned with medical education in the four corners of the earth afford a rare opportunity for promoting international good-will. The setting in a university campus has been particularly conducive to such relationships.

The China Medical Board, the co-sponsoring agencies, and the medical schools are to be congratulated for this signal contribution toward the promotion of international understanding. We suspect that dollar-for-dollar the return from these conferences is as great as any investment in the complex arena of international good-will.

U. S. Medical School Alumni

WILLIAM H. STEWART, M.D.,* and MARYLAND Y. PENNELL, M.Sc.†
Division of Public Health Methods, Public Health Service,
U. S. Department of Health, Education, and Welfare, Washington, D.C.

A total of 233 medical schools in the United States (and Puerto Rico) had graduates living in mid-1959. The currently active 4-year schools number 78, into which 61 former schools have been merged, whereas the balance of the schools have become extinct over the years. Schools with their first graduating class in 1959 or later are excluded from this study.

The number of living graduates of all U.S. medical schools was about 220,500, not including the June, 1959, graduating classes. About 210,500 physicians were graduates of currently active schools; of these, about 208,000 were living in the United States, Puerto Rico, and the Territories (or in Federal service regardless of location). This information was tabulated from the individual physician punch cards provided to the Public Health Service by the American Medical Association.

Of the physicians located in the United States, Puerto Rico, and the Territories in mid-1959, the currently active medical schools have supplied 87 per cent—93 per cent of those in Federal service and 87 per cent of the non-Federal physicians, as indicated by the figures in Table 1.

Graduates per school.—For each of the 78 active medical schools, the number of graduates living in the United States, Puerto Rico, and the Territories is shown in the accompanying table. The range is from 6,215 at the Jefferson Medical College of Pennsylvania, where classes have been graduated annually since 1826, to 66 at the University of Mississippi through its recently developed new program. As would be expected, the eleven schools established since 1940 or expanded from 2-year to 4-year programs, indicated by an asterisk in Table 2, have the smallest numbers of total graduates. Among the four other schools with fewer than 1,500 graduates prior to 1959 are three that have had small classes graduated annually for more than a century,—namely, Albany Medical College, Woman's Medical College, and the University of Vermont.

The schools with the largest numbers of total graduates, ranked in that order, are: Jefferson Medical College, University of Illinois, University of Pennsylvania, Harvard Medical School, Northwestern University, New York University, and University of Michigan. These seven schools have provided nearly one-fifth of the national physician supply.

Graduates in private practice.—About 141,000, or two-thirds, of the graduates are in private practice. Those in private practice include 71,000 engaged in full-time specialization and 70,000 in general practice or part-time specialization. Those not in private practice are in hospital service (interns, residents, and other full-time staff), in other medical

* Chief of the Division of Public Health Methods.
† Statistician in the Division of Public Health Methods.

TABLE 1

Medical school	All physicians	Federal physicians	Non-federal physicians
Total graduates	238,011	17,519	220,492
U.S. school graduates:	217,703	16,540	201,163
Active schools	208,006	16,329	191,677
Extinct schools	9,697	211	9,486
Not U.S. school graduates	20,308	979	19,329

practice (teaching, research, administration, and public health), or not in medical practice (retired or for other reasons).

Half of the schools show that 68 per cent or more of their graduates are in private practice. The schools with the highest proportions are Stritch, Creighton, Rochester, Hahnemann, and Meharry.

The schools with markedly low proportions of graduates in private practice are usually those with their first graduating classes since 1950 and, hence, relatively large numbers are still in hospital training programs. Among the older schools with low proportions of graduates in private practice are Yale, University of Chicago, Johns Hopkins, Harvard, Syracuse, and Woman's. These are the schools which have high proportions of their graduates engaged in hospital service or other forms of medical practice.

Full-time specialists.—The active medical schools have graduated a total of nearly 90,000 physicians classified as full-time specialists. About 80 per cent of these specialists are engaged in private practice, the balance being in hospital service or other medical activities.

Half of the schools show that 42 per cent or more of their graduates are engaged in full-time specialization. The schools with the highest proportions are Yale, Johns Hopkins, Harvard, Columbia, Cornell, New York University, and Rochester.

As noted for private practice, the more recently established schools have relatively few of their graduates already classified as full-time specialists. Among the older schools with low proportions of specialists are Medical Evangelists, Howard, Chicago Medical, Stritch, Woman's, Tennessee, and Meharry.

Woman's Medical College has relatively few full-time specialists when only a small proportion of all graduates are engaged in private practice. It is more usual to have a high proportion of specialists among the schools with low proportions of graduates in private practice.

Physician's location.—Nearly half (47 per cent) of the physicians, excluding those in Federal service, are located in the same state where they attended medical school. About 16 per cent are in adjacent states, while 37 per cent are farther away.

Half of the schools show that 48 per cent or more of their graduates establish themselves in the same state as their alma mater. The schools with the highest proportions (70 per cent or more) of graduates so located are University of California at Los Angeles, Southern California, Stanford, University of California at San Francisco, Wayne, Buffalo, Pittsburgh, Texas Southwestern, Texas Medical, and Baylor. Three-fourths of the physicians graduated from all medical schools in California and in Texas are located in those same states.

Meharry Medical College heads the list of schools with low proportions of their graduates located in the same state. Only 8 per cent of the Meharry gradu-

TABLE 2

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State	Name of medical school	Total number of living graduates	Private practitioners		Full-time specialists		Non-federal physicians		
			Number	Per cent	Number	Per cent	Total	Located in same state as school: Number	Located in same state as school: Per cent
	All 78 schools	208,006	141,005	68	89,802	43	191,677	90,148	47
Ala.	*Medical College of Alabama	809	445	55	160	20	696	475	68
Ark.	University of Arkansas	2,045	1,410	69	672	33	1,832	845	46
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	*University of California, L.A.	138	10	7	5	4	110	87	79
	University of Southern Calif.	1,634	1,094	67	705	43	1,527	1,375	90
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	Wayne State University	2,400	1,727	72	977	41	2,277	1,754	77
Minn.	University of Minnesota	4,538	3,104	68	1,990	44	4,165	2,173	52
Miss.	University of Mississippi	82	2	2	1	2	54	22	41
Mo.	St. Louis University	4,251	3,110	73	1,734	41	3,897	1,013	26
	Washington University	3,554	2,393	67	1,858	52	3,254	1,094	34
Neb.	Creighton University	2,269	1,681	74	768	34	2,094	880	42

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ates are in Tennessee; 26 per cent are in adjacent states, and 66 per cent are farther away. All three schools in the District of Columbia have relatively few of their graduates located in the District. This is to be expected since city lines have been used in place of state boundaries for the analysis. At least two-thirds of their graduates are in states once removed from the District. The University of Chicago, Johns Hopkins, and Creighton also have their graduates widely dispersed. On the other hand, some of the schools have graduates in large proportions (24 to 34 per cent) in adjacent states, namely, Yale, Tulane, Woman's, Vanderbilt, and Vermont.

The extent to which the individual states rely on facilities within their own boundaries, in contrast to those in adjacent or other states, varies considerably. A total of 21 states and the District of Columbia have obtained more than half of their physician supply from medical schools within their borders. Five states have obtained more than half of their physicians from medical schools in adjacent states. Another 20 states have obtained more than half of their physicians from schools located neither in their state nor in an adjacent state. The remaining four states do not fall into any of these patterns.

Year of graduation.—Location, type of practice, and specialization are all a function of how long the physician has been out of medical school. Basic data for each of the 78 active 4-year medical schools on the number of living graduates according to year of graduation are available in Health Manpower Source Book 11 (Public Health Service Publication No. 263, Section 11). Single free copies of this 319-page report by Stewart and Pennell may be obtained from the Public Health Service.

Medical Education Forum

Editorials

A LONG COLD WINTER

As this Editorial is written, it is clear that the chances for Congressional enactment of the program for Federal Aid to Medical Education are exceedingly dim. We have been bombed out by Khrushchev's threats over Berlin, his satellites, missiles, and astronauts.

Many medical schools had planned bold new programs based on new faculty and new facilities financed in part by federal funds. The urgent need for additional loan funds for students seemed to be capable of solution through federal support. Now the chances of initiating such programs are remote.

The A.A.M.C. is often criticized (and envied) by educators from other fields because of our effective role in establishing the urgent need for federal support. Although the chances are dim, we can still pull the chestnuts out of the fire if the deans and faculty members express their needs to their congressional representatives. We have leaned too heavily on our very effective presentations in Washington and have failed at the grass roots level.

Otherwise we face a long, cold winter.

HOW TO WIN FRIENDS

It is pleasant to acknowledge the receipt of the Proceedings of The Fifth Annual Conference for Foreign Medical Scholars which was held at the University of Rochester in June, 1961. With financial support from the China Medical Board and the co-sponsorship of organizations active in international health, these conferences, which began in 1957, have become an important platform for the discussion of problems and programs in medical education in the wider world.

The Proceedings of The Fifth Annual Conference includes a number of excellent papers on subjects ranging from "The Development of Medical Education in the United States" by Robert A. Moore to "Decision-Making in Our American Medical Centers" by Joseph C. Hinsey.

Anyone who has been fortunate enough to attend one of the conferences is well aware that the printed reports, valuable as they may be, cannot catch the real spirit and vital force in the meetings.

The contacts between faculty members concerned with medical education in the four corners of the earth afford a rare opportunity for promoting international good-will. The setting in a university campus has been particularly conducive to such relationships.

The China Medical Board, the co-sponsoring agencies, and the medical schools are to be congratulated for this signal contribution toward the promotion of international understanding. We suspect that dollar-for-dollar the return from these conferences is as great as any investment in the complex arena of international good-will.

THE VOLUNTARY HEALTH AGENCIES

The importance of the voluntary health agencies in medical education has been recognized repeatedly in the pages of this *Journal*. Many of us have been concerned about maintaining progress in the voluntary agencies in the face of the rapid expansion of Federal health programs. There has also been concern over the competitive attitudes of specific disease organizations and United Fund groups. Thus, medical educators will be anxious to follow the impact of the report of the 2-year survey of the voluntary agencies.

The report states that too many of the agencies are guilty of bitter and wasteful competition for funds; a predominant desire for self-perpetuation as against public interest; and failure to present a fair and balanced picture of their activities.

The establishment of a National Commission on Voluntary Health and Welfare Agencies, coordination of planning and a uniform system of accounting and financial reporting are among the proposals in the report.

Medical education was represented on the Committee by Joseph C. Hinsey and Lowell T. Coggeshall.

The recommendations of the report should receive careful consideration by the voluntary agencies. It is evident that some of them, such as the American Heart Association, have recognized the problems and are endeavoring to resolve them.

JOHN Z. BOWERS

Datagrams*

APPLICATION ACTIVITY AND MCAT DATA OF APPLICANTS TO THE CLASS OF 1960-61

The number of students accepted for enrollment in U.S. medical schools in 1960-61 increased the total by 48 over last year. This is the sixth consecutive yearly increase, in this instance the direct result of welcoming the University of Kentucky College of Medicine to the roster of U.S. medical schools (see Table 1). This addition is less than 1 per cent of the 8,560 students receiving acceptances; however, similar increases can now be anticipated almost yearly as the nation's universities endeavor to meet the medical manpower needs of the population. In contrast, the total number of applicants dropped to 14,397, the fourth such decrease in numbers since 1956-57, and a loss of approximately 4 per cent from 1959-60.

TABLE 1

SUMMARY OF APPLICATION ACTIVITY DURING THE PAST 14 YEARS

	Applications to Medical Schools			
1st year class	Applicants	Total	Per individual	Accepted applicants
1947-48	18,829	56,279	3.0	6,512
1948-49	24,242	81,662	3.4	6,973
1949-50	24,434	88,244	3.6	7,150
1950-51	22,279	81,931	3.7	7,254
1951-52	19,920	70,678	3.5	7,663
1952-53	16,763	56,319	3.4	7,778
1953-54	14,678	48,586	3.3	7,756
1954-55	14,538	47,568	3.3	7,878
1955-56	14,937	54,161	3.6	7,969
1956-57	15,917	59,798	3.8	8,263
1957-58	15,791	60,951	3.9	8,302
1958-59	15,170	59,102	3.9	8,366
1959-60	14,952	57,888	3.9	8,512
1960-61	14,397	54,662	3.8	8,560

In view of the continued and growing attractions that other disciplines offer, it is not unlikely that the current trend will continue. Although absolute numbers of applicants may increase as a result of increasingly larger enrollments in undergraduate colleges, comparable increases in the total number of accepted applicants can also be anticipated as a function of the development of new schools of medicine. The last century has witnessed a growth in the number of professional personnel which is over 3½ times faster than that of the general population growth for the nation. In this context John W. Gardner, President of the Carnegie Corporation, notes that, "The demand grows out of the nature of our society . . . We are just beginning to understand that one of the distinguishing marks of a modern, complex society is its insatiable appetite for educated talent." If this generalization is true, medicine can anticipate even greater competition in the future.

* Submitted by the Division of Basic Research of the AAMC, 2530 Ridge Avenue, Evanston, Illinois.

Table 2 indicates that the pattern of application activity has not yet adversely affected the quality of accepted applicants. The mean of the 1960-61 applicant scores on the MCAT subtests are generally equivalent to last year's averages for accepted, rejected, and total applicant groups alike.

TABLE 2

MEAN MCAT SCORES OF ACCEPTED AND REJECTED APPLICANTS DURING THE PAST 9 YEARS

	ACCEPTED APPLICANTS						REJECTED APPLICANTS					
Year	VA	QA	MS	Sci	No. taking MCAT	Total N	VA	QA	MS	Sci	No. taking MCAT	Total N
1952-53	522	526	519	525	7,346	7,778	465	459	467	457	7,398	8,985
1953-54	519	525	524	530	7,426	7,756	461	457	472	460	5,801	6,922
1954-55	517	521	530	533	7,527	7,878	457	455	473	459	5,661*	6,660
1955-56	524	528	527	522	7,688	7,969	466	459	476	454	6,652*	6,968
1956-57	525	525	526	519	8,012	8,263	463	458	473	445	6,859	7,654
1957-58	528	517	527	516	8,223	8,302	467	452	472	442	6,840	7,489
1958-59	527	532	520	523	8,301	8,366	461	456	467	441	6,305	6,804
1959-60	529	527	527	527	8,449	8,512	470	455	473	449	6,019	6,440
1960-61	527	533	527	533	8,500	8,560	464	453	473	449	5,462	5,837

	TOTAL APPLICANTS					
Year	VA	QA	MS	Sci	No. taking MCAT	Grand Total N
1952-53	493	492	493	491	14,744	16,763
1953-54	494	495	501	499	13,227	14,678
1954-55	491	493	506	501	13,188*	14,538
1955-56	497	496	503	490	14,340*	14,937
1956-57	496	494	502	485	14,871	15,917
1957-58	500	487	502	482	15,063	15,791
1958-59	499	499	497	488	14,606	15,170
1959-60	504	497	505	494	14,468	14,952
1960-61	503	501	506	500	13,962	14,397

*Estimated

Slight increases in the Quantitative Ability and Science Achievement mean scores of the accepted applicants parallel similar increases in the total applicant group so that no inferences can be made regarding an increased interest in these scores by the admissions committees. Further, the increases are minor and may be attributable only to yearly fluctuations.

The critical question remains one of projecting current short-range trends in the medical manpower pool. Presently both short- and long-range trends presage increasing difficulty. A number of options for intervention by the schools and interested organizations exist, however. These include active recruitment efforts at both high school and college levels, informal and formal procedures for the better distribution of available talent, and increasing present and new sources of financial aid to medical students.

Address

SCIENCE, EXCELLENCE AND THE DEMOCRATIC SOCIETY*

FREDERICK L. STONE, PH.D.†

In the past several years many kind words have been spoken about "Excellence." At least since 1958 when the so-called "Rockefeller Report" on "The Pursuit of Excellence" was published the President's Science Advisory Committee and many other groups have earnestly urged more respect and support for the ideal of excellence.

I am a little bit concerned about this. It has been said that when men talked most about the ideals of "Home," "Mother," and "Family," the women were deciding that what they really wanted was equal rights with the men. I am afraid that something like that may be happening today: that while we talk of excellence, acceptance of mediocrity is rising like a tide and may sweep everything before it. I am genuinely concerned that this may happen.

To begin with, if we are to support something, we must first identify it. Now of what does excellence consist, in science? Is the really valuable factor intuition, as Einstein thought? Or is it the faculty of imagination, which enabled Kekule to hit on the idea of the benzene ring while idly dreaming of the arrangement of atoms? Or is it rather an ability to make fruitful hypotheses? Or the capacity for patient, sustained experimentation and the ability to observe the unusual?

Clearly, what we have to do with here is the simple fact that there are many different kinds of scientific minds. Some of you have read W. I. B. Beveridge's stimulating little book[1] on the art of scientific investigation and will recall that he concluded that we may be able to divide scientists into two types, with the majority falling somewhere between the two extremes. These two types were, he thought, the systematic and the speculative. And, of course, both types are equally needed in science, as they are complementary.

Those of us administering research and training programs will not go wrong in supporting any of these types of truly scientific minds. The biggest problem will be for us to identify the real talent in this nation's schools, to develop it, and then to support it well.

Let me tell you how we are going about trying to do this in my own operation, where we want to uncover and develop talent among those who have the potential to become investigators and teachers in basic biomedical and health-related sciences.

One pioneering effort which we have tried was an experimental training grants

* An address delivered May 8, 1961, as the final presentation in the Distinguished Lectures in Science Series, in connection with the Honors Science Program, Providence College, Providence, Rhode Island.

† Chief, Research Training Branch and Assistant Chief, Division of General Medical Sciences, National Institutes of Health.

[1] W. I. B. Beveridge, The Art of Scientific Investigation. W. W. Norton, 1951.

program. The rapid increase in medical knowledge and the rise in the standards of medical practice over the past few decades led to the development of somewhat rigid and intensive curricula in our medical schools. A more flexible and adaptable curriculum appeared to be needed in the education of future medical investigators and teachers, and this experimental training program was set up. One of the main purposes of the program was to encourage the early development of research interests and skills in undergraduate medical students and to assist the medical schools in identifying and giving special attention to highly motivated students.

The program was so successful over the past 5 years that we have just continued it and expanded it under the new name of Medical Student Research Training Program. No firm pattern is given to schools participating in the program; they are encouraged to design their own plans for exploring new processes and techniques for the research training of students.

In this way we hope to encourage undergraduate medical students to undertake serious research training which will prepare them for careers in medical research and academic medicine and to make it possible for medical schools receiving these competitively awarded grants to identify and select medical students having a clear potential for productive careers in research and academic medicine.

Now, encouraging as this and other of our biomedical training programs have been in identifying and training talent, I have to tell you that critical shortages continue in research personnel as well as in the teaching fields. This shortage continues to have a restraining effect on the research and training efforts of the Federal government, private research institutions, private industry involved in health-related programs, the voluntary health groups, and the nation's schools and universities.

At least four aspects of this total manpower problem are crucial:

1. Needs for investigators and teachers in the basic biomedical and health-related sciences far exceed the supply;

2. Research in the clinical fields is depending even more heavily on advances in the fundamental sciences and continues to pull personnel out of the basic areas, mainly because of higher salaries;

3. Many more physician-investigators have put greater demands on university and preclinical science departments for basic science training; and

4. The medical teaching program must be expanded in order for the Nation's supply of physicians to remain adequate for the needs of a greatly expanding population.

The critical importance of meeting all these needs is forcefully brought home if we remember that it takes between 5 and 10 years to prepare a scientist for a productive career. Training efforts undertaken now in our graduate school will show results between 1965 and 1970—when the requirements will be even more severe than they are now. The nation must start now in our undergraduate schools, and even now it is very late.

In the face of a challenge of these dimensions, those of us responsible for research and training in biomedical areas have a large task—and a tremendous opportunity. All our resources, both conceptual and financial, are needed if creative new programs are to be implemented to supplement the old.

One such new departure was this Honors Program here at Providence College. We believed that it might be possible for an outstanding liberal arts college such as Providence College to provide a small group of highly selected and motivated undergraduate students with a maximum possible indoctrination in physics, chemistry, mathematics, and the fundamental principles of biology. The aim is to turn out, at graduation, a few students whose various backgrounds will be ideally suited to the rigors of graduate study in any one of the professions or in any one of the modern-day biological sciences, including biophysical science.

I would like to say here that Providence College was unusually well qualified to help us in this experiment in undergraduate training in which one of the main aims is to attract young people into a career in medical research. In the first place, it has had since 1950 a Medical Research Laboratory; in the second place, its campus is located in the center of a large group of federal, state, and private hospitals, whose laboratory personnel have consistently cooperated with the college and could be expected to welcome students of this program for specialized research training or instruction; in the third place, the State of Rhode Island appropriated funds for the construction of a Nuclear Research Reactor which, I now understand, is to be built at Fort Kearny on Narragansett Bay for the use of all the institutions of higher learning in this state.

In addition to all of this, and most importantly, the faculty of the college was willing to assume heavy additional responsibilities, and Father Hickey was given a full leave of absence from all other duties and responsibilities in order to devote his entire energies and skills to this program. An effort was successfully made to obtain from the Atomic Energy Commission equipment for radioisotope technology education. The faculty was expanded, with an additional instructor being added in physics, chemistry, biology, and mathematics, the new instructors having half the normal teaching load to permit more individualized contact with selected students.

This is an exceedingly interesting program. The curriculum incorporates several innovations. The major portion of the science class work is concentrated in the first 2 years. The final 2 years, including the summers after the junior and senior years, are predominantly devoted to actual research in the biomedical field of the student's choice.

The ideal of the program is to move students through their educational training at the fastest pace commensurate with their abilities. This means that no definite length is assigned to any specific course. As soon as it is evident that the student has received the maximum benefit from a given course, he moves on to the next more advanced one, whether or not a full semester has been completed. Thus, you can see that there is no shepherding of students lockstep in merciful convoy through a prescribed ritual.

Father Hickey tells me that the program has progressed more smoothly than he expected. The program has been in full operation since September, 1960, and only two students have dropped out. There was some feeling at one time that a little too much was being required, even of these gifted students, but the experience so far bears out one theory we were operating on: a friendly, *stimulating* atmosphere will encourage the best in anyone, and among these young Honors Program students we are seeing excellence float to the surface.

The faculty is succeeding here, in its efforts to convey a sophisticated picture

of the current quantitative approach to biology expressed in physical and chemical terms, while providing undergraduates with the chance to progress at a rate commensurate with their own potential.

I might say that a special effort with its central focus on selected liberal arts colleges is now being considered, in an attempt to determine what kind of programs should be supported in these colleges. Our pressing manpower needs are such that we must do more in encouraging and supporting college-level research and training. We can't afford to ignore these excellent possibilities.

When the Russian Sputnik went up in October, 1957, it was a rude awakening for our country—most of us suddenly became aware that here was a new force to be dealt with. Those of us involved in research and research training could read the message clearly.

In the post-Sputnik era there has been a lot of attention given to the need for research: mostly concentrated in the physical sciences and in connection with the "space race," of course. The newspapers like to talk of a crisis in science, and of a desperate shortage of scientists, as if this were a new thing. There is a crisis, and a desperate shortage, but the Russians don't deserve the credit for creating either the crisis or the shortage. This is sometimes forgotten.

Most people realize on the basis of their own experience that there are not enough doctors and dentists. However, neither is there enough supporting personnel. Neither are there enough technicians or scientists or any other kind of specialized personnel needed to meet the new demands of science in any field from astronomy to zoology.

This is a result of many things. The growth in population has proportionately exceeded the increase in numbers of our health services personnel, just as it has exceeded the increase in the number of teachers for our children. And science itself has created whole new fields, as new tools and new disciplines demand more and more scientists to open up more fields which will in turn demand more scientists.

At the same time, the premium is on *quality*, as never before. Future scientific breakthroughs in biology and medicine, for example, will probably be made by scientists who have intensive fundamental training in chemistry, physics, mathematics, with additional specialized training in some particular field of biomedical interest. In our day, the chemistry of life processes, investigations of the elemental molecular and atomic constituents of organic substances, studies of endocrine and nutritional factors in human reproduction, and the use of electronic microscopes and the development of biomedical instruments which are specifically engineered to enable us to deal with problems encountered at the level of the cell and below—these complex researches are the rule, not the exception. Mediocrity has no place in the modern laboratory. It never did have.

Our support of *the best* is infinitely more important than our support of *the next best.*

As we strive to double and redouble the numbers of our scientists, it is worth remembering that there is room for all those with real talent to work in the laboratories of science. There is room for the many kinds of scientific minds I was speaking of earlier, and without any regard for whether they work in "basic" or "applied" science, provided it is "good," true science.

There is a great amount of talk about these two things, incidentally. The

distinction between "basic" and "applied" science is very difficult to make, seldom worth while, and not well understood. In the end the distinction, if made at all, depends upon the point of view of the scientist and not upon the result.

Sometimes the distinction can be made: as when one thinks of the organic chemists working with a condensation polymer—that has been called "basic" research—and the nylon stockings that resulted from that research, which is sometimes called "applied" research. The cleavage line is never clear, however.

If one looks backward in the field of medicine, it can be seen that the years of effort spent in isolating and identifying viruses and growing them in the laboratory were "basic" research, and that the vaccines developed to combat influenza and polio were the practical application of this research. The many studies over the years in a variety of areas—embryonic development, circulation, kidney function from fish to man, chemistry of blood plasma, and so on—represent "basic" research which has made possible the application of new knowledge resulting in the marvels of modern surgery and medicine.

Looking to the future, work going on now with deoxyribonucleic acid (DNA), and ribonucleic acid (RNA) no longer seems remote from practical application, even though the intervening steps are many and are obscure. One scientist in Israel has recently provided direct evidence suggesting that the RNA complex makes and stores the antibodies which form during immunologic reactions, and, as you probably know, our greatest obstacle at present to successful organ transplantation is immunologic in nature. The solution to the difficulties of replacing vital organs will be found in such "basic" research.

In the field of endocrinology, an NIH-supported investigator working with the Cecropia moth found that the "juvenile hormone" of insects exists in human tissue. This hormone, when injected into insects, keeps them in a juvenile state, lengthening their life span. The demonstrated survival of this hormone in man may be nothing more than a biological curiosity; however, it is impossible not to speculate upon the possibilities for controlled rates of aging in man.

In talking about how progress is made in medicine it is worth mentioning that research "breakthroughs" come about in two ways. One way is for a brilliant investigator to open up new pathways with a dramatic discovery; this happens occasionally, but not often.

The other way is the usual way: the patient clearing of the way through a series of important but unspectacular findings. This way is well illustrated by the tedious but important labors of Dr. Sarah Stewart of the National Cancer Institute of the National Institutes of Health. Noticing that injection into newborn mice of cell-free mouse leukemia extracts produced an unusual type of tumor of the salivary gland, Dr. Stewart and Dr. Bernice Eddy, of the Division of Biologics Standards at the NIH, were able to determine that the polyoma virus is a single agent, not a group of agents. Someday a major "breakthrough" by some supremely gifted researcher may make it possible to immunize man against leukemia or one of the other cancers, but when that time comes, the way will have been paved for him by the work of many others, perhaps in fields apparently unrelated to tumor biology.

Now, there is no research without researchers, and man's mind is the most important instrument. Research work exercises a powerful fascination for the human mind. It enables us to satisfy our curiosity, our desire to know. If we

know the effects, such is our curiosity that we want to know the causes.[2] These are, of course, the words of St. Thomas Aquinas, and they are as true today as they were 700 years ago.

The use of *scientific methods* to satisfy man's insatiable curiosity is a development of the last three or four centuries. It is almost wholly a product of Europe, and, with a few isolated, original experimenters such as Franklin, Henry, and Gibbs, America was without much of a scientific tradition until the 19th century.

This was because we had a wilderness to conquer, and man needs a measure of security and some of the accepted creature comforts before he can turn to more abstract pursuits. It was because ours was a country without a scientific tradition. Europe was the Great Mother of original investigation, and Americans went "abroad" to study.

During the 19th century American science began to develop, with the early demands for more engineers and scientists in industry, and the classical curriculum made way for special emphasis upon such "plebeian" studies as chemistry and biology and physics. After World War I, America for the first time ceased to rely heavily on Europe and became more self-sufficient. During and after World War II, America came into her own.

What is most remarkable is that the strong role of the federal government in support of research is very new. Let us narrow to medical research support, and in 1940—just a little more than 20 years age—the federal money spent was three million dollars. The same year private sources donated 42 million dollars.

In 1960, the federal government support had increased more than 100-fold, to 380 million dollars. Nonfederal sources were supplying almost that much, 335 million dollars.

Let me very briefiy outline for you the role of the National Institutes of Health in all this medical and health-related research.

As the principal research arm of the Public Health Service, the NIH carries out what is perhaps the world's most comprehensive medical research program. It supports research in more than 1,000 academic and research organizations throughout the world, operates training programs to supply and improve the quality of scientists in fields basic to health research, helps finance research facilities, and conducts appraisal of research needs, opportunities, and resources.

Currently, its budget for research is about 400 million dollars. An additional 132 millions go for research training, and other expenditures bring the total budget to an estimated 585 million, in 1961.

About 80 per cent of public funds appropriated to NIH is in turn awarded to nonfederal institutions such as medical schools and colleges, universities, hospitals, and other institutions for the support of research under what is called the extramural program.

Research project grants constitute the largest part of the extramural program. The purpose of these grants is to stimulate research in medical and allied fields by actively encouraging investigations of specific problems by providing support for the best men and ideas.

The scientific community plays a vital role with the federal government in

[2] Compendium Theologiae, c. 4.

this program. All applications for research support are assigned to study sections composed of eminent scientists drawn from the scientific community. The actions of the study sections are reviewed by the National Advisory Councils, composed of outstanding specialists in medicine, science, and public affairs. No grant is made without Council approval.

The support of research training and related activities is a distinct and separate part of the extramural program. These efforts serve to supplement sums provided by State and local governments, private philanthropy and other income sources of doctors, dentists, nurses, and research scientists. There are two basic types of support for the training of research personnel: (*a*) fellowships and traineeships and (*b*) training grants.

Fellowships and traineeships provide personal support, and in some instances provide for certain additional costs, for persons engaged in research training at various levels. Training grants are mainly for the purpose of assisting institutions to establish, expand, or improve their research and special training programs and to increase the number and improve the quality of trained personnel in fields of major interest to the various Institutes.

This brings me to the intramural program. We have at NIH seven Institutes, where research is going on in the fields of cancer, heart disease, dentistry, arthritis and metabolic disease, allergy and infectious disease, mental health, and neurological diseases and blindness. There is also a 500-bed Clinical Center, jointly supported by the Institutes. The intramural program endeavors to adapt its program to changing health needs and emerging scientific opportunities available within the Public Health Service.

In addition to the Institutes there are four divisions at NIH: Research Services, Research Grants, Biologics Standards, and General Medical Sciences. As Assistant Chief of the Division of General Medical Sciences and as Chief of the Research Training Branch, I would like very briefly to tell you something of our programs.

The Division was created in 1958 to do three specific things not then being carried out adequately:

1. Provide support for fundamental biomedical research—that is, research in the structure and functioning of living systems, in contrast to research directed toward understanding or therapy of a specific disorder, as in the Institutes.

2. Insure a supply of biomedical scientists adequately trained in the disciplines and techniques of modern biological and medical research.

3. Insure grants for research not otherwise adequately supported through the disease-oriented extramural programs of the seven Institutes and directed toward the large problems of biology: aging, tissue transplantation, genetics, etc.

The research work supported by this Division can be classified into six major program areas: (*a*) *Chemistry of life processes.* The disciplines of this vast field approach life processes according to the elemental molecular and atomic constituents of organic substances; (*b*) *Developmental biology.* In this field are studies ranging from single gene action to the growth of the individual; (*c*) *Clinical fields.* This includes research on particular disease problems outside areas of interest of the Institutes of NIH; (*d*) *Public health, medical care, and nursing*; (*e*) *The development of special methods and tools of science*; (*f*) *Clinical research centers.* This last large and important program awards grants

to institutions such as medical schools and research hospitals for the establishment of special, separate research units or centers, so that various basic and clinical skills may be focused on a variety of diseases.

In these six research areas the Division is supporting nearly 1,600 projects with about 35 million dollars.

A Center for Aging Research operating within the Division has the responsibility for serving as the NIH focal point for information and stimulation of research in aging. It is anticipated that the Center and other NIH components will have been instrumental in aiding programs of about 20 million dollars in support of research in this area during 1961.

The Division is the principal NIH unit responsible for research training and fellowship programs in the fundamental medical and biological sciences.

The research training program provides funds to public and private nonprofit institutions, such as medical schools, for the establishment, expansion, or improvement of graduate training. Twelve regular programs are operated by the Division in biomedical areas where scientific manpower shortages exist. These twelve programs may be grouped under four main heads:

Ultrastructure.—This research training includes the fields of molecular biology, histochemistry, cytochemistry, animal anatomy at the cellular and subcellular levels.

Physiological science.—This research training seeks to train scientists and engineers broadly in the sciences applicable to the development of instruments for the measurement of biological systems above the molecular level (we call this biomedical engineering), and areas of study in physiology include for our purposes cellular physiology, neurophysiology, endocrinology, psycho-physiology, and so on.

Chemical science.—This research training is widely diversified biochemistry including enzymology, radioisotopes, vitaminology and protein structure, etc. Included under this group is our training in pharmacology, which includes toxicology, drug metabolism, chemotherapy, cellular pharmacology, and so on.

Mathematics.—Epidemiology and biometry research training is designed to provide scientists especially trained in this type of biological and medical research. Such experts can design valid experiments, provide statistical mathematical analyses of the results of experiments, and develop biostatistical theory of epidemics in man and in animals. Along with the biophysical sciences the aim here is to turn out scientists who are at ease in quantitative biology.

I will not bore you with more details, but you can see from this slide the different patterns of growth in the programs 1958–1960—biochemistry rising from fourth to first place and pathology from third to second. I also want to mention that four areas accounted for 50 per cent of the total expenditures in 1960.

Our basic science training grants are running currently at approximately 27 million dollars. In addition, we maintain a number of research fellowship programs designed to help competent students through the graduate schools and universities and to expand opportunities for intensive training of predoctoral and postdoctoral candidates. Our Post-sophomore and Part-time Student Fellowships enable students to get some exposure to research at the undergraduate

level, thus recruiting additional minds into medical, dental, public health, and nursing research fields.

Under our Research Career Award Program, we aim to encourage, support and stabilize research careers in medicine, dentistry, public health and related areas. We are thus doing something—be it ever so little—to help relieve the shortage of researchers and teachers in preclinical sciences and for the encouragement of outstanding talent from the early stages of the student's career through to mature scientists and teachers.

Our research fellowships are receiving about 10 million dollars, at this time.

In administering these training and fellowship programs in support of basic biomedical research, we have a definite philosophy. We never lose sight of quality first! We need more, better trained scientists, not just more scientists. We try to encourage excellence in the most practical way we know: by nurturing it.

Is excellence possible in a democracy? Our public schools seemingly have two quite different missions: they have to produce a literate populace, and they have to encourage the talented minority. It is a difficult, but not an impossible, task. Our literacy rate attests to the efficacy of American education in general, and such American-educated Nobelists as Beadle, Enders, and Kornberg attest to the success of American education in producing quality while at the same time trying to educate everybody.

Frankly, in my opinion, however, most school systems have ignored their responsibilities to the gifted students. It sometimes seems that the whole aim of modern education "is to assure that Simple Simon never learns that Socrates was a better man"—in Gerald Johnson's fine phrase. Some modern schools have shown lavish concern for the average or retarded student, but what of the brighter one? In this comfortable way, no one is made to feel inferior—nobody loses, and everybody is happy. But equal opportunity for all does not mean that all men are equal. What is a challenge to one mind is a brick wall to the boy next to him in class. Failure to remember this will give us a Mediocracy instead of a Democracy. We must see to it that our schools provide adequately for all levels of talent.

David Riesman observed that, if our children are supposed to learn democracy by underplaying the skills of intellect and overplaying the skills of gregariousness and amiability, then skill in a democracy, based on respect for ability to *do* something, tends to survive only in athletics.[3] It was Riesman, too, who suggested that the talented in school are today afraid to let it be known—they will be considered *different!*

Recently there appeared in *Science* an article[4] on the college student's idea of the scientist. For whatever it is worth, the image of the scientist was not too flattering. The scientist was seen as intelligent and hard-working, but uninterested in people, not "well-rounded," and too much of a non-conformist. Only 3 per cent of the college women wanted to marry this intelligent but *different* being, the scientist.

I don't know if you have seen the Carnegie Institution Report for 1959–1960.

[3] David Riesman, *The Lonely Crowd*, p. 64. New Haven: Yale Univ. Press, 1950.

[4] The College-Student Image of the Scientist. *Science*, 31 March, 1961.

If you have not, I urge you to get it. President Caryl Haskins has written an absolutely brilliant essay, in which he points out, among other things, that for science in its public function the protection of the individual and his independence, the honor of free thought and free expression, the public welcome of dissent, are vital. Now, the enemies of these things are inattention, lassitude, hostility to innovation, and, "perhaps most important among these subtle dangers for the scientific way is the threat of simple, widespread, massive misunderstanding of its nature, its purpose, its indispensable place and part, not only in our practical world, but as a vital part of our deepest philosophy and belief."[5]

Haskins is deeply disturbed to note the gulf which all of us know frequently is found between the scientific disciplines on the one hand and the humanistic disciplines, on the other. This he calls the dichotomy of "the two cultures," and, as he says, we can ill afford it.

Ten years ago—in 1951—Sir Henry Tizard remarked that science used to be studied as a cultural subject. Tizard said, "One difficulty about higher education in the democratic countries is that the large majority of men who study science do so with the intention of following a professional career in science. It is seldom deliberately studied as a cultural subject, as is ancient or modern history, or philosophy."

But this was not always so. Fifty years ago it was not so. "When I was a young undergraduate at Oxford," said Tizard, "it was still quite normal for a man to take a scientific degree as a preparation for a career in law, in business, or in public service at home or abroad. In Mr. Churchill's war-time administration there were three prominent Ministers who had taken first class degrees in chemistry at their respective universities."

The dichotomy of "the two cultures" would seem to be a comparatively recent development.

Thirty years ago the Spanish philosopher Ortega y Gasset had some provocative things to say about those who use science and those who produce its results. Every day the average man benefits from science through new inventions, new anesthetics, new vaccines, and multiplication of wealth, comfort and health—and yet, Ortega observed, there was no sign of the masses imposing on themselves any sacrifice of money or attention in order to endow science more worthily.[6] Ortega saw this new common man as a "new primitive," bent largely upon enjoying himself.

Whatever truth there may have been in this idea in the past, the complex, inter-related demands upon our citizens in the 1960's *require* self-sacrifice and a keener appreciation of the inherent value of the scholar and the scientist.

Recently there has been strong evidence of an awakening on the part of a considerable part of our population, in this regard. One of those who has been a leader in these matters has been Rhode Island's own Congressman, John Fogarty, who addressed this group last fall when he received the first "Veritas" medal.

At the same time all of us would like, if possible, to keep the "two cultures"—scientific and humanistic—from drifting even further apart. This Honors Pro-

[5] Report of the President of the Carnegie Institution, pp. xxvi-xxvii.

[6] Ortega y Gasset, *The Revolt of the Masses*, p. 93. London: Allen & Unwin, 1932.

gram at Providence College is doing something concrete in this regard by providing broad and intensive instruction in mathematics, physics, chemistry, and the study of living systems *and* nonspecific cultural courses such as foreign languages, English, history, philosophy, and theology.

The success of this program and others will help narrow the gap between the "two cultures." As someone has said,

> Plato and Cicero would have been very much surprised to hear that geometry, astronomy and the sciences of nature in general, are excluded from the humanities . . .[7]

To return to my question, "Is excellence possible in a democracy?"

The answer is, "Yes," IF—if imagination is shown in encouraging excellence, and if we are not *all* satisfied *all* the time with mediocrity and its comfortable connotations.

This means sacrifice. It means the displacement of the ideal of two sets of tail-fins in every garage as the highest of human goals and its replacement with a dedication to ideals greater than ourselves. "Really to live," said Ortega, "is to be directed toward something," and a creative, energetic life is, as he saw, somewhat in danger of going out of modern life.

This is the challenge of the future. The future belongs to that society that makes the best total use of its science. This is the real meaning of the Russian threat. Dr. John Turkevich of Princeton summed it up well[8] when he said, "The role of science is dominant in the future of nations . . . That form of society will prevail that best integrates science into its structure, that makes science a vital part of its defensive might, economic productivity, social well-being, intellectual activity and spiritual aspiration."

In Russia the monolithic state has according to a set plan forcibly integrated science into its society—a method of short-term strength and long-term weakness. But can the Western World integrate modern science into its domestic society more successfully than the Russians have done? This is the challenge . . .

We can do it if we will make the effort. Whether we will succeed, I do not know. I am speaking tonight in Albertus Magnus Hall, and the words of that great scholar come back to me: "for in these matters, experience alone can give certainty."

[7] Report of the Harvard Committee on "General Education in a Free Society," p. 55. Cambridge: Harvard University Press, 1950.

[8] Dr. John Turkevich, Eugene Higgins Professor of Chemistry at Princeton University, address delivered at the Mass Media Awards Dinner, Thomas A. Edison Foundation, New York, March 20, 1961.

Communication from India

We have just finished selecting our entrance class for the academic year 1961-1962, and I thought a few somewhat random remarks concerning applicants to Indian medical colleges might be of interest to the medical educator in America.

Ordinarily the Indian student enters medical college after passing the Secondary Education Board, which is the approximate equivalent of our high school, and completing one year of premedical education of college level. Thus, the applicant to medicine is on the average 17 or 18 years old, some 3-4 years younger than their counterparts in America.

A serious weakness of premedical education in India relates to its lack of depth and breadth of general knowledge and wisdom. Far too many applicants to medical colleges have overdeveloped narrow fields of the so-called "required" subjects with a resultant stunting of their capacities as a whole. This narrowness of preparation is abetted and compounded by the immature age at which students are admitted into medicine. Until the Indian Medical student is permitted greater maturity and given an opportunity to acquire a more substantial breadth of general intelligence, he will not be in a competitive position with his counterpart in the United States. This is in no wise an unfavorable comparison of innate ability but rather an explanation of an actual disparity of opportunity.

Interviews with applicants in general reveal a lack of knowledge on current world affairs. It is disconcerting, to say the least, to find that many premedical students with very good grades in the required subjects know little about what is happening in the world around them, even what is happening here in India. Parenthetic to this problem, I am presenting a paper at the annual conference of the Indian Association for the Advancement of Medical Education this coming November on the subject, "An Appraisal of Medical College Admission Procedures," in which there is a recommendation that this Association sponsor an admission test patterned after our M.C.A.T. Such an examination would be of significance not only in the further evaluation of the broad intellectual qualifications of the applicant but, and of equal importance, would stimulate an interest on the part of the premedical teacher as well as the student in a greater breadth of education. This should be one examination for which the student could not cram.

A matter of growing concern to Indian educators in the scientific disciplines is that of a deterioration of the knowledge of English on the part of the applicant. India for the most part is divided into linguistic states, and, with the resurgence of nationalism following independence, there is a tendency to deprecate English as a medium of instruction in schools. All medical colleges instruct in English, and in my estimation it is of crucial importance at this particular stage of India's educational evolution that this language be continued as the medium of instruction in the scientific professional colleges. The serious problems the language situation presents to the student is readily understandable. One of the applicant aptitudes of prime concern to our admissions committee is the ability to communicate well in English. I am sure you will agree with me

that great credit is due our Indian medical students who face not only a difficult academic course but must master this course in a foreign language. Parenthetically, it is interesting to note that the President of the Indian Association for the Advancement of Medical Education, Vice-Chancellor Mudaliar of Madras University, has been a leading exponent in Indian academic circles of the importance of the knowledge of English in scientific education.

An important facet of applicant motivation relates to the major role the Indian family plays in the decisions of its individual members. For example, this role is a well-known factor in the contracting of marriages. Careful questioning of the applicant or medical student in many instances will reveal that the decision to enter medicine as a profession was a family decision. The parents, uncles, aunts, and other relatives frequently select a child for medical college somewhat after the fashion that families in the West may select children for the priesthood. Having made the selection, in which the selected may or may not have had much say, the entire family joins forces economically and otherwise to attain their objective. Such a procedure has certain favorable characteristics but at the same time may ignore entirely the factor of personal motivation.

In these remarks I have dwelt on a few problems peculiar to the medical college applicant of India. I would be remiss were I not to add that, in spite of certain adverse situations not entirely of their own making, the 50 students selected for this year's freshman class at this institution have the basic qualifications which over the next 5 years should permit their maturation into doctors of whom India may be proud.

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Letters to the Editor

For the last 3 years, a mechanical learning device has been developed and used as an aid in anatomic and clinical pathology. Because it has proved both useful and popular with our students, we are forwarding a description of the apparatus.

The device, seen in Figure 1, is constructed of wood and composed of three separate units electrically connected. It is 6 feet in length, 2 feet high, and 18 inches deep.

A series of case histories with multiple choice or true and false questions is typed and mounted in the left hand compartment. Photographs (2×2 in.) of tissues, photomicrographs, copies of charts, and other illustrative material are placed in the center compartment and the corresponding photographs numbered on the protocol. The student then selects and presses the button on the right-hand compartment for the answer he has chosen. A green light will flash if the answer is correct, and a red light, if the answer is wrong. The pressing of other buttons will enable the student to ascertain the correct answer.

The apparatus is provided with removable legs of pipe so that it may be set up as an independent unit. We have found, however, that it is used more when placed on a table with several chairs around it. The cost of the device, exclusive of the wiring which was done by the author, was $100.00.

The left unit has a composition board back for ease in attaching papers with thumb tacks, and is illuminated by a show case bulb located behind the bottom wooden lip. On the front of this lip is a spring-loaded master switch which energizes the entire device. This has recently been replaced by an electronic proximity switch so that the device automatically turns on when a student

Fig. 1

approaches. The compartment is covered with a pane of glass sliding in a groove along the sides and protruding slightly from the top. The top edge of the glass is dulled for safety.

The center unit is a slotted wood frame with a glass front which holds colored slides. It is lighted by an incandescent x-ray illuminator to avoid the interval required for a fluorescent bulb to ignite. A lock fastens the slide holder into its frame. A reading glass is provided on a chain so that the slides may be slightly magnified.

The right-hand unit consists of a locked door containing 40 push-buttons arranged in four vertical rows of ten buttons each. A sheet of plexiglas is fastened to the back of the door with 2″ wooden spacers (Fig. 2). A 110-volt line connects the master switch to a 6-volt transformer fastened to the door. One lead of the transformer is attached to a common bus bar supplying one terminal for all 40 push-buttons. The other terminal of each of the push-buttons is connected to a "Nu-Way Stud"* fastened to the plexiglas panel in a pattern corresponding to the push-buttons on the front. Nu-Way Snaps* are soldered

*Obtainable from Allied Radio Corp.

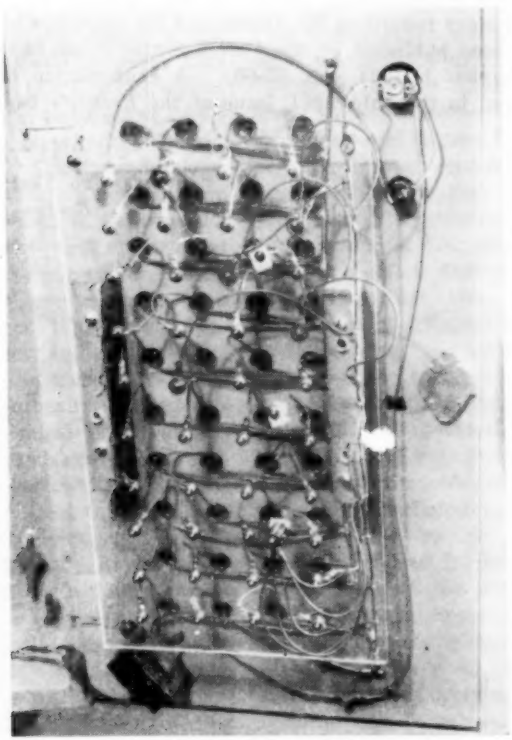

Fig. 2

to long wires coupled to the other transformer termina[1]. The Snaps are attached by pressing onto the Studs. The circuit is closed by pressing the correct push-button which flashes a green light. Another light has been added, and a series of jumper wires constructed with snaps on both ends, so that the snaps may be ganged and connected to the incorrect studs, thus allowing the red light to flash for a wrong answer. There is a 4″ clearance between the plexiglas and back wall of the compartment so that sufficient space is available for locked storage of extra light bulbs, jumper wires, etc. Provision is made on the back for a constantly hot electric plug.

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In the December, 1960, issue of *The Journal of Medical Education*, 35:1177, 1960, a letter was published in which the actions of Mr. Stanley Omor Okullo, a student from Uganda, who had attended a medical school in Russia for 2 years, were described in condemnatory terms. It may interest your readers to learn that a different story regarding Mr. Okullo and the education of foreign students in Russia had been published by the *United States News and World Report* in its issue of August 1, 1961 (pp. 59-60). A confirmation of that story has recently appeared in the July, 1961, issue of the *Reader's Digest* (pp. 99-104).

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ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

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Abstract Editor

The German Pharmaceutical Industry. O. GERHARDT. German Medical Monthly, Vol. VI, No. 1, pp. 23-25 (Jan.), 1961.

This survey reviews the development of the German pharmaceutical industry from its beginnings in the early 19th century until today. Seen as an important milestone is a small advertisement which appeared in 1827, in "Pharmaceutisch-chemisches Novitaten-Cabinet." In it, Emmanuel Merck (1794–1855), a pharmacist of Darmstadt, offered "a new class of drugs wholesale in order that they may be brought to the public notice, and especially enable doctors and pharmacists to conduct experiments cheaply with these drugs." The new preparations, which laid the foundation for the firm now known as E. Merck A. G., were described as "16 of the most outstanding vegetable bases and their salts." Many other of the famous great German drug companies can trace their beginnings back to the pharmacy, and another large group stems from the tremendous progress in the bio-synthesis of chemicals in the German chemical industries. It was the dyestuff industry, above all, whose by-products enriched the pharmaceutical treasure chest of the world. In 1884, the dye factories of Hoechst brought out "Antipyrin"; Bayer manufactured "Phenacetin" in 1888; and at the World Fair in Paris, at the turn of the century, both these companies showed at least 2 dozen other drugs synthesized by their chemists as by-products. Until the beginning of this century, the pharmaceutical industry was based essentially on the important triumvirate of chemist-doctor-pharmacist; the chemist, with little or no knowledge of medicine or pharmacy, created new products by juggling with the "building blocks of matter"; the doctor tested their efficiency; and the pharmacist constituted the connecting link between the two. A decisive influence on pharmaceutical progress was provided through medical advance in the discovery of the causes of disease, thanks to Pasteur and Koch. The first specific solution along these lines was brought by Emil von Behring (1854–1917), first Nobel Prize in Medicine, whose blood serum therapy for diphtheria and tetanus laid the basis for an entirely new branch of the pharmaceutical industry, that of healing sera, prophylactic inoculation, and antisera. This new field, too, was opened in the Hoechst dyestuff factory in 1894. Another important step, the finding of compounds to act specifically against the cause of any particular disease, was accomplished through Paul Ehrlich's (1854–1915) "Salvarsan," which was released for sale by Hoechst in 1910, after many years of experiment and trial and after 65,000 ampoules of arsenicals (provided by Hoechst dyestuff works) had confirmed its specific effect as antisyphilis treatment. In 1913, Germany was already at the head of the world pharmaceutical industry, providing 30.3 per cent of its products. World War I, severing sources of supply to many European and overseas countries and forcing them to expand their own drug industry, meant a serious setback to

Germany's pharmaceutical industry. Its survival was largely due to the development, in German laboratories, during the war years, of chemotherapeutical agents of great significance, including drugs effective in the treatment of sleeping sickness, bilharziasis, malaria, etc. In this field, discovery and production have been depending almost entirely on German science and industry. World War II dealt German drug production and trade an almost fatal blow. By 1949, however, after the stabilization of the German economy, the Federal Bureau of Statistics could record a West German pharmaceutical production amounting to DM 400 million. By now, West Germany, although still far from her share of the world market in 1938, has attained fourth place in world pharmaceutical production, with 13.2 per cent, the U.S. being at the head with 34.5 per cent.

The Problem of Foreign Medical Graduates. WILLARD C. RAPPLEYE, M.D. Hospitals, (Feb. 16), 1961.

The problem is discussed in relation to the rapid expansion of "approved" hospital internship and residency during recent years. Recognized internships, having increased over 50 per cent since 1941, number 13,032 this year, as compared with 7,081 graduates of American medical schools. A factor which also affects the present number of unfilled hospital positions is that now almost all internships, owing to the requirements of the Selective Service, are limited to 12 months (formerly 18–24 months). Approved residencies increased almost 600 per cent in the last two decades (from 5,256 in 1941, to 31,733 today), largely because of the post-war expansion of residency programs for returning service men. The present gap between the number of hospital positions and that of graduates from American schools has led to the demand that the latter graduate enough physicians to fill all the hospital positions now available. Dr. Rappleye, however, believes that far too many residencies and internships have been approved than ought to have been, since many of these are now intended more as service functions for staff and hospital than for truly educational purposes. At present, 12,000 graduates of foreign medical schools from 91 countries (mostly from Philippines, Mexico, Turkey, Korea, Japan, and India) are filling house staff positions in this country: 3 per cent are U.S. citizens who studied in Europe; about 10 per cent are aliens with immigrant visas; and about 20 per cent have exchange visitor or student visas. Although some of the foreign doctors—mostly the 28 per cent representing recognized European schools—have had advanced training and are well prepared, a large portion of those who entered in recent years come from areas and institutions which do not provide advanced training. Inadequately trained, they have gone mostly to hospitals unable to attract graduates of American medical schools, so that in many sections of the U.S. there are now two classes of patients as far as house staff services are concerned: those cared for by adequately prepared physicians, and those attended by doctors with substandard training. Hospital positions, on the other hand, are offered foreign graduates under the guise of "educational opportunities" by institutions whose primary concern is to secure help for routine hospital services. To remedy this situation many states have set up different screening procedures to evaluate foreign graduates' qualifications, and a number of screening programs have been brought together in a joint effort by the Educational Council for Foreign Medical Graduates. Their stated objectives are "to promote oppor-

tunities in the U.S. for advanced studies in medicine so that the level of medical care throughout the world might be raised," and "to determine that the foreign medical graduate reach a level of attainment comparable to U.S. and Canadian schools." The author feels, however, that these goals are wishful thinking, unattainable in most instances. Screening procedures, he points out, are deficient because they have to rely almost entirely on the multiple choice type of test. Proof of such inadequate evaluation is seen in the fact that 71 per cent of those foreign graduates who took their certification examinations in September, 1960, according to recent E.C.F.M.G. regulations, received either the standard or temporary (2-year) certificate, a far too large proportion, in Dr. Rappleye's view. He thinks that screening procedures should precede rather than follow entrance to this country. Underlying the whole problem, he points out, is the long-term challenge to this country of assisting the scientific, educational, and medical efforts of underdeveloped countries. Whereas a number of medical schools and leading foundations have been helping these efforts with excellent results, the employment of below-standard foreign doctors in American hospitals does not benefit anybody in the long run. Among the many suggestions to help meet the situation caused by the reduction in foreign medical graduates in internships and residencies under the recent E.C.F.M.G. regulations, the most logical solution, in Dr. Rappleye's opinion, would be the employment of well qualified recent graduates on a full-time or part-time basis.

Massachusetts General Hospital Anniversary Year. The New England Journal of Medicine, Vol. 264, No. 4, pp. 200-201 (Jan. 26), 1961.

On the occasion of Massachusetts General Hospital's sesquicentennial anniversary celebration (June, 1960), two new histories of the hospital were presented: one, a condensed story in book form, for the general public, is by J. E. Garland (author of, among other medical writings, *An Experiment in Medicine*); the other, by Dr. James Howard Means, the hospital's former chief of medical services, has been published as a special article in this same issue of the *New England Journal of Medicine* (pp. 174-78). Reviewing the history of the hospital, Dr. Means stresses its important role as a teaching institution, from its very beginnings. He also emphasizes the great post-war "research explosion," which has been accompanied by huge government-supplied and private funds, and its influence on medical education. Also pointed out is the danger of permitting the industrial concept of mass production to infiltrate academic medical circles. Although it can be assumed that, given good leadership, the quality and value of research will be maintained, Dr. Means is concerned about the threat to a continuing *devotion* to the art of medicine, involving the moral qualities of "compassion, and insight, and understanding of interpersonal relations." As the Massachusetts General Hospital moves into its fourth half-century, it faces a world, never faced before, in a state of "pathologic growth and delirium," teeming with problems for which solution there are no precedents. Will the Massachusetts General, as the oldest teaching hospital in New England, recognize its obligation to take the lead in finding new ways to tackle these problems? Science alone, Dr. Means emphatically states, can never be enough. The best wish one can offer the hospital on its anniversary is, in his opinion, that it "broaden her front to encompass new necessities and push on with more resolution than ever before."

Educating the Whole Man (Editorial). Nature, Vol. 189, No. 4758, pp. 1-3, (Jan. 7), 1961.

In an address before the Imperial College of Science and Technology, Sir Cyril Hinshelwood affirmed again his disbelief in the "two cultures" (the scientific disciplines and the humanities), and his conviction that instead there are simply "two attitudes," and that it is up to the universities to encourage the "right" one, outlining what he meant by it and how to develop it. Sir Cyril's address is compared to a lecture by Sir Mark Oliphant, recently delivered at the University of Melbourne. Although the latter does believe in the existence of "a gulf between two cultures," he, like Sir Cyril, condemns the educational methods responsible for perpetuating such a gulf. From kindergarten to the university, he points out, our educational processes deliberately preserve the schism in Western culture. It often seems as though there were a "conspiracy" among educators to widen still more the gap between the two aspects of our culture. In his opinion, those who strive most assiduously to make the gap unbridgeable are the humanists, who continue to fight a rearguard action against science. Scientists, on the other hand, are usually either indifferent toward the humanities or openly contemptuous. Sir Mark, recognizing the serious threat to mankind which has risen from scientific and technological advance, expresses the belief that only through education can we hope to convey to every individual some understanding of science and some idea of the forces which are shaping his life and destiny. He stresses the need of making science as much a part of universal education as history or English. Science taught as a general culture subject, however, must have a different approach than education in science for the budding scientist. It must be presented as a unity, but preserving always the questioning, eager approach to the world, the bedrock of the inquiry into nature. By displaying the contributions which all nations have made to the advancement of science, science teaching may well help to dispel some of the illusions which feed nationalism. The keystone of science is the pursuit of truth, and this pursuit is in no way incompatible with "the preservation of human dignity, the eternal values of art and literature, or with the ethical principles which must govern men's lives." He concludes that science has positive contributions to make to all human activities and even may be apt to uphold the basis of value judgments at a time when the religious authority for these is disintegrating. Both Sir Cyril and Sir Mark are pleading for a re-thinking of the whole basis of education, so that science and its relation with man may permeate its whole fabric and the existing rift between science and other forms of culture may be repaired.

The Child Health Conference. A Teaching Forum for Medical Students. NINA BLEIBERG, M.D. New York State Journal of Medicine, pp. 586-90 (Feb. 15), 1961.

This report, by the Chief of the Infant and Preschool Division of New York City's Department of Health, describes how the latter utilizes one of its child health stations for the teaching of medical students. For the last 7 years, the Division Chief and a supervising physician have served as instructors of third-year students of the New York Medical College. Because of its geographic proximity, child health stations at the East Harlem Center were selected for weekly teaching sessions (2–2½ hrs. long), groups of three to four students being usually assigned to each session, which starts with a brief outline of the objectives, procedures, and content of the

child health conference. Children (1–3) selected from the morning case load are assigned to the group for physical examination and study, under the direct supervision of the assigned instructor (who is present during all phases of the conference). Before the physical examination, the recorded history of each child is usually reviewed by students and instructor who meet in a separate room, and the group is encouraged to raise questions. Later, the child and mother are invited into the conference room to provide data on the family's or the child's history which need to be amplified. This part of the conference, it is pointed out, gives the instructor an excellent opportunity to demonstrate how to conduct a meaningful interview. The observations made (in form of mental notes) during these interviews provide the basis for the discussion which follows. Two students are then assigned to the physical examination of each case; all physical findings are checked and verified by the instructor. A conference with the mother follows, in which the examination results are explained, as well as immunization procedures, and recommendations for treatment or prevention are made. To demonstrate the steps previously outlined and to illustrate the important concepts that were brought into focus during one session, a case report is reproduced in detail. Although a random example, it shows that the following precepts can be taught in this setting: (*a*) interview with a parent (otherwise rarely offered at the undergraduate level); (*b*) importance of the family as a unit; (*c*) sharpening of diagnostic skills; (*d*) assessment of behavior and of emotional and social growth.

Teaching Methods in Dental Education. ROY T. DUROCHER, D.D.S. The New York Journal of Dentistry, Vol. 31, No. 3, pp. 75-79 (March), 1961.

The need for a reform of dental education, which so far has experienced virtually little changes from inherited traditions, is discussed in the light of the main principles underlying the significant changes that education on a lower level has undergone in recent years. Attention is drawn (*a*) to the selection and arrangement of activities and (*b*) to two methods of presenting them: the lecture, and the "problem-posing," or problem-solving teaching procedures. At present, the older theories of learning, based primarily on the memory process and acquisition of facts, are giving way to the concept that learning is a process of changing behavior patterns through appropriate experience situations—that is, essentially, the discovery of solutions to problems. Although subject matter must remain important, course content must be used as a means of coping with challenges and problems and the curriculum focused on those types of experience which the student should have in order to insure the appropriate reaction to a future situation. Methods of implementing the curriculum should therefore envelop an instructional program which is related as closely as possible to the problems encountered in the facets of dentistry. The over-all learning experience should be so integrated that interrelationships between the different areas of knowledge are stressed and facilitated. Owing to the vast body of knowledge in dentistry, the restriction of course content to subject matter found within a particular textbook can be no longer justified. Suggested are some ways to achieve the best selection of subject matter (based on L. Thomas Hopkin's recommendations in *Curriculum principles and practices*, p. 133, Chicago, 1929). As to methods, the author offers some guiding principles for the use of the lecture, as well as for the "problem-posing" approach, outlining the criteria for the selection of problems.

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Review

Preparation for Medical Education: A Restudy. By AURA E. SEVERINGHAUS, HARRY J. CARMAN, and WILLIAM E. CADBURY, JR. New York: McGraw-Hill Book Company, Inc., 1961. 393 pp. $7.95.

The forerunner of this book, *Preparation For Medical Education in the Liberal Arts Colleges*, published in 1953 and by the same authors, constituted a landmark in the history of medical education. That survey involved visits by the authors to 115 selected liberal arts colleges in the United States over a period slightly longer than 2 years.

As a result of this stimulating publication there arose a widespread demand for a resurvey, by the same team, to assess progress in the directions outlined in the previous book. Accordingly, in 1958 the same Sub-Committee on Pre-Professional Education was reassembled and again, with one exception, visited the same 115 schools. This book represents the findings on the resurvey.

The first 128 pages of this book are reprinted from the first volume, since these chapters were deemed to be essential background for the reader to whom the first volume is not available.

The findings of the resurvey are presented in the next 132 pages of the book. For convenience the material is grouped under five major headings. These are "The Total Educational Span," "The Gifted Student," "The Culminating Year," "Problems on Medical School Admissions," and "The Place of Science in Pre-Medical Education."

The last third of the book is made up of appendices, including the program of the Third Buck Hill Falls Conference held November 9–12, 1958, in connection with this resurvey. Here the formal papers presented at this conference are reproduced with the exception of that given by Dr. James B. Conant which has been published independently (*The American High School Today*, published by McGraw-Hill, 1960).

In his introduction Dr. Severinghaus states that "the reader could not fail to recognize as he goes through the chapters of this book the underlying policies which guided the survey, but a brief statement at this point may be helpful. Every study of this kind must decide at the outset whether it will limit itself largely to factual reporting or whether it will combine the factual reporting with practical advice. We have clearly chosen to do the latter. But we have seen the value of doing all this and something more. We have at times indulged ourselves by taking the opportunity to speak with some enthusiasm on matters which seem to us to be of major importance. At times our lack of enthusiasm has taken the turn to be frankly critical. It is our hope that the straight reporting will prove valuable, that the practical suggestions will be studied by many, with profit to some, and that what we choose to call our 'enthusiams,' which quite naturally lie in areas where differences of opinion and controversy are to be expected, will stimulate rather than offend the reader."

This reader was immensely stimulated and in no way offended!

Abstracts

Blakiston's Illustrated Pocket Medical Dictionary. Edited by NORMAND L. HOERR and ARTHUR OSOL. 2nd ed. New York: McGraw-Hill Book Company, Inc., 1961. $4.75.

This is a direct descendant in the line of medical dictionaries initiated by Dr. George M. Gould. To determine which terms are of current importance to nurses, medical assistants and secretaries, dental assistants, pharmacists, medical laboratory technicians, and students, the authors fol-

lowed the advice and counsel of many educators and practitioners. In every case final decisions on definitions are based on usage by teachers and other professional workers in the medical and allied fields.

Microbial Cell Walls. By M. R. SALTON. New York: John Wiley & Sons, Inc., 1960. 87 pp.

This is the fourth volume in the Ciba Lectures in Microbial Biochemistry Series given at the Institute of Microbiology, Rutgers, The State University of New Jersey. This book, based on these lectures, illustrates the successful application of the techniques of biophysics, chemistry, and biochemistry, to one facet of microbial anatomy. The material in this book does not represent a complete record of investigations on microbial walls. It has been selected with the hope that it will give an orientation to the newcomer or interested reader and a more detailed record on several aspects of wall chemistry for the initiated investigator requiring a summary. The book emphasizes some unusual features of the chemical substances and structures found in bacterial cell walls and outlines some of the unique biochemical processes involved in the formation of the cell walls and the manner by which antibiotics prevent the assembly of the walls.

A Synopsis of Physiology. Edited by C. C. N. VASS. 5th ed. Baltimore: Williams & Wilkins Co., 1961. 320 pp. $8.00.

This synopsis is not intended to replace a standard textbook. Where possible, material has been presented in tabular form, which requires careful study by the reader if he is to obtain the maximum information. The object is to give a fairly full summary of modern physiology, particularly human physiology, in a small compass. It is offered as an aid to students in preparation for examinations and to practitioners wishing a means of making a quick survey.

Aids to Physiology. By E. T. WATERS, 5th ed. London: Bailliere, Tindall & Cox, 1961. Available through Williams & Wilkins Co., Baltimore. 272 pp. $3.00.

This new edition of this small, handy, pocket-size book has been completely rewritten. Its object, however, remains the same: so to present the subject to the reader that he will be able to select and apply to the greatest advantage the information he has previously assimilated or is currently receiving in his lectures. An effort is made to give the student not only the basic background of the subject of physiology, but also bring to his notice some of the "highlights." The book is intended to supplement, not supplant, either lectures or the standard textbook.

Clinical Diagnosis and Laboratory Examinations. By JOHN A. KOLMER. 3rd ed. New York: Appleton-Century-Crofts, Inc., 1961. 529 pp. $10.00.

The present edition has been completely rewritten with the inclusion of 142 diagnostic tables and summaries, devoted largely to the clinical significance of changes in laboratory examinations in relation to diagnosis and differential diagnosis. This edition, the same as its predecessors, is written for practitioners of the medical and dental professions, teachers, clinical pathologists, and medical technologists.

Illustrating Medicine and Surgery. By MARGARET C. MCLARTY. Baltimore: Williams & Wilkins Co., 1960. 155 pp. $8.50.

The author has, in her own words, "sought to set down some fundamental procedures for the making of drawings, paintings and the preparation of charts, etc., for general medical illustrating." The book is devoted to illustrating only and does not include animation, mulage, teaching models, or the scientific exhibit. Only material of the widest interest and of the greatest help to the majority of workers in this field has been included.

Oakes' Dictionary for Nurses. By NANCY ROPER. 11th ed. Edinburgh: E. & S. Livingstone Ltd, 1961. Available through Williams & Wilkins Co., Baltimore. $2.75.

In this first new edition of this dictionary since the death of Lois Oakes an attempt has been made both to bring it up to date and also to include the etymology and a biographical note where appropriate. The

book remains a small compact size, easily carried in the pocket of the uniform for instantaneous use.

Bailliere's Pocket Book of Ward Information. Revised by MARGERY HOUGHTON. 10th ed. London: Bailliere, Tindall & Cox, 1961. Available through Williams & Wilkins Co., Baltimore. 208 pp. $2.50.

The purpose of this book, which originally appeared under the title of *Nurses' Pharmacopoeia*, has always been to help the student nurse in her studies and to provide a useful pocket book for the trained nurse. The title was changed in 1953. In this edition much of the material has been revised or totally rewritten.

New Horizons for Canada's Children. Proceedings of the First Canadian Conference on Children. Edited by B. W. HEISE. Toronto: University of Toronto Press, 1960. 199 pp. $2.00 paper, $4.50 cloth.

Summaries of the discussions were made by project groups, other group discussions and of the whole conference by individuals. These summaries and statements, together with the formal speeches, have been reviewed and edited by the speakers and make up the main portion of these Proceedings. The titles of the main addresses were "What do we Owe the Children," "Children in Canada—Present and Past," and "A Cross-Cultural View of the Child and the Family." The group sessions summaries were "Chairman's Remarks," "The Early Years," "The Middle Years," "The Transition Years."

Stedman's Medical Dictionary. Compiled by 23 consulting editors. 20th ed. Baltimore: Williams & Wilkins Company, 1961. 1672 pp. plus Appendix. $14.95.

The 50th anniversary of this well known dictionary has resulted in a complete resetting of the book. Thousands of new definitions have been written, and thousands of new entries have been inserted. Nomina Anatomica (Parisiensia) is the controlling system for anatomical nomenclature. Every term in the NA list appears in its alphabetical order and is there defined and identified by the letters NA in brackets. Alternate names for the same structure are, when necessary, also entered in alphabetic order and cross-referenced to the NA term. Tables have been liberally used for many entries—e.g., methods, operations, diseases, anatomical structures, pharmacological terms. The tables are placed in their proper alphabetical position in the body of the dictionary, and an index to them appears in the preliminary pages. A special effort has been made to include many more dental terms than medical dictionaries ordinarily carry. This edition has thousands of these terms, and will be as useful to dental practitioners and students as it is to the medical profession. There has been a like effort to present many more terms relating to veterinary science. Such wholesale alteration has demanded a resetting of the entire works, which now appears in a new typeface, easier on the eyes, in an arrangement that makes it easier to find information. The page is larger, and there are more pages. No marks to show pronunciation are given where pronunciation is obvious to any reader of English. Stress marks are utilized in other cases, and the term is respelled phonetically, if necessary. The illustrations have been vastly improved. Nearly all plates have been replaced, mostly with drawings especially made for this edition.

Pathologic Physiology—Mechanisms of Disease. Edited by WILLIAM A. SODEMAN, with 28 contributors. 3d ed. Philadelphia: W. B. Saunders Company, 1961. 1134 pp. $15.00.

While maintaining the same approach to the subject as in previous editions, the authors of this revision have attempted as far as possible to reduce normal physiology to a minimum to insure a satisfactory understanding and interpretation of the abnormal. Certain sections have been revised completely or have been rewritten. The section on genetics by Dr. Gendell now approaches the subject through recent new techniques which have given a better understanding of many problems in human disease. Dr. Ray has completely redone the

section on water and electrolyte balance. Dr. Killough revised almost completely the material on protective mechanisms of the lungs, and Dr. Goldstein has rewritten the section on the gallbladder and pancreas. A most important change is the approach to diseases of the nervous system, completely rewritten by Doctors Alpers and Mancall. In general, the interrelationship of certain facts and material in the various sections has been worked out for a more effective integration of thought and concept.

Textbook of Biochemistry. By EDWARD STAUNTON WEST and WILBERT R. TODD. 3d ed. New York: The Macmillan Company, 1961. 1357 pp. $16.75.

In this edition are to be found a careful and thorough revision of facts and theories and changes in emphasis, necessitated by the exceedingly rapid advances in biochemical knowledge. The general organization of previous editions has been retained, but with changes in approach to various subjects designed to give the student a more thoroughly integrated understanding of biochemistry in its many relations. To do this has required that many chapters of the book be largely rewritten and the material extensively rearranged. Because of increased information relative to the metabolism of special tissues, and the importance of these tissues to medicine, a new chapter dealing with the composition and metabolism of special tissues has been added. Also a new chapter has been devoted to the metabolism of nucleic acids. The elementary physical chemistry contained in previous editions is included, though somewhat restricted in detail. However, its relation to special topics of biochemistry has been given particular attention. In short, this text has undergone a drastic revision in the interest of clarity and understanding for the student of medical sciences.

Essentials of Neurosurgery. For Students and Practitioners. By SEAN MULLAN. New York: Springer Publishing Company, Inc., 1961. 258 pp. $6.75.

This book is offered as a framework of neurosurgical knowledge useful both to the student and to the established practitioner. It begins with a description of the anatomy of the skull, ventricles, and cerebral arteries as seen through the eyes of the radiologist. To underline the central position of the thalamus there is a short reference to embryology. This is followed by a chapter on epilepsy to facilitate a review of many facts of physiological interest. The clinical manifestations of locally disordered brain function are described in the chapters devoted to tumors; thus they are not emphasized again when damage of other types (head injury, abscess and infarct) is considered. Congenital lesions, which logically could come first, are considered near the end, perhaps because therapeutically they are rather disappointing. Technique is not discussed in detail; it is a specialized field; but a few words on the history of the development of present knowledge and techniques conclude the book. A selective list of references is included. Statistics have been used sparingly and have been given in rounded numbers. The drawings in the text are pen and ink equivalents of the blackboard sketches often used to illustrate lectures.

Relief of Symptoms. By WALTER MODELL. 2d ed. St. Louis: C. V. Mosby Company, 1961. 354 pp. $11.50.

This book is offered as a practical guide to the problems of providing patients with relief from distress. In this it is unique. It is the contention of the author that what the symptom causes can be as important as what causes the symptom and, therefore, that the relief of distressing symptoms comprises an exceedingly important part of modern medical care. Further, that relieving the symptom is not necessarily simpler than treating the cause of a precisely diagnosed disease but that it often presents even more complex problems in therapy and in the evaluation of results. Everything discussed in this book bears directly on the relief of symptoms and is planned to serve as a basis for relieving them and for using drugs which are not yet obtainable or even discovered. The list of 27 symptoms discussed is not exhaustive; nevertheless, it

includes well over 95 per cent of those which bring patients to a doctor's office. Because of its origins as well as its point of view, this book is addressed largely to medical students and to younger graduates whose philosophy and habits of practice have not yet "set." It is not intended to be either a source book or a heavy textbook. In this second edition much use has been made of the reviews and reactions to the first edition. Some changes in presentation have been made; the initial theoretical section has been shortened and compressed and the practical section has been enlarged. The major thesis of the book remains unchanged, although it is the hope of the author that its presentation and implementation have been improved.

Hypnosis in Obstetrics. Obstetric Hypnoanesthesia. By RALPH V. AUGUST. New York: Blakiston Division, McGraw-Hill Book Company, Inc., 1961. 153 pp. $10.00.

This is the first and only current work covering the techniques and the specific use of hypnosis in clinical obstetrics. It is a lucid, "how-to" book based on clinical experience for the specialist as well as for the nonspecialist whose practice includes obstetrics. In this book the author presents specific details on how to manage different types of patients and also discusses those patients with whom hypnosis is contraindicated. He also describes the entire field of childbirth from the study of infertility to post-delivery comfort which has been covered from the standpoint of hypnotherapy. Included in this book is a 33⅓ rpm long playing record which presents selected excerpts of tape recordings of six patients in obstetric delivery under hypnoanesthesia.

Obstetrical and Gynaecological Pathology. For Postgraduate Students. By R. E. REWELL. Edinburgh & London: E. & S. Livingstone Ltd, 1960. Available through Williams & Wilkins Company, Baltimore. 426 pp. $10.00.

This book is intended for the obstetrics and gynecology resident. It does not pretend to be a practical manual and can give the reader only a theoretical basis for his clinical work. It may perhaps give some assistance to the pathologist or surgeon with general experience in pathology but limited experience in its special fields. It is obvious that it has been written by a morbid anatomist. Important subjects such as endocrine physiology, isoimmunization, or anemia are dealt with briefly, but no apology is offered for this brevity. Fairly full references have been given. Preference has been given to articles published in English and in journals which are easily available, but the references are not limited to these.

An Introduction to Animal Physiology. By W. B. YAPP. 2d ed. New York: Oxford University Press, 1960. 401 pp.

It has been 20 years since the first edition of this book was written. At that time the author stated as his reason for writing it his belief that young zoologists should know more physiology than they usually do. The same desire dictated a revised second edition. The book attempts to cover in an elementary way the whole range of animals, as distinct from human or general, physiology. In this revision, whereas the general form has been retained, several sections, such as those on intermediate metabolism, respiration, muscular contraction, and hormones, have been completely rewritten, and emendations have been made throughout the book to bring it up to date. Several new figures and tables have been added.

Practical Notes on Nursing Procedures. By JESSIE D. BRITTEN. 3d ed. Edinburgh & London: E. & S. Livingstone Ltd, 1960. Available through Williams & Wilkins Company, Baltimore. 195 pp. $4.00.

In this, as in previous editions, an effort has been made to give a concise outline, enhanced with clear drawings, of basic nursing procedures, which will be of value to student nurses and to pupil assistant nurses. Although no completely new sections appear in this third edition numerous additions have been made in diagrams and sub-sections, all combining to give a comprehensive survey not only for systematic study but also as a companion for im-

mediate reference in day-to-day ward procedures.

Orientation in Pharmacy. By RALPH W. CLARK. 2d ed. Philadelphia: Lea and Febiger, 1961. 166 pp. $4.50.

The objective of this book is, as the title indicates, to present an over-view of pharmacy to beginning students. Brief surveys of some of the main facts and ideals of the profession are included in the book. The importance of new drugs and their subsequent distribution is pointed out. The contents were planned as a foundation for future study. They include some requirements of the profession which may serve as a guide for the student to determine whether or not he wishes to continue in pharmacy as a career. This edition of the book has been considerably revised and enlarged. Some of the contents have been rearranged. A chapter on the pharmacy library has been added.

Management of Medical Emergencies. Edited by JOHN C. SHARPE with 19 contributors. New York: McGraw-Hill Book Company, Inc., 1961. 336 pp. $9.75.

This volume is another in the series being published by McGraw-Hill based on postgraduate symposia and courses offered by the Division of Continuing Education in Medicine and Health Sciences at U.C.L.A. Designed as a practical guide for the practicing physician, this work is based on the authors' actual clinical experience in the recognition and practical management of the most common medical emergencies. The subjects which were chosen for discussion represent many of the most common medical emergencies, as well as subjects in which management has changed to some extent over the past few years. Each emergency is defined, and the usual signs and symptoms are presented; the differential diagnosis is outlined, and the prognosis is given.

Inflammation and Diseases of Connective Tissue. A Hahnemann Symposium. Edited by LEWIS C. MILLS and JOHN H. MOYER with 148 contributors. Philadelphia: W. B. Saunders Company, 1961. 885 pp.

Investigators from the United States and abroad, whose interests ranged from basic biochemistry to clinical management of patients, from immunology and bacteriology to pathology and pharmacology, were invited to contribute to this symposium held in Philadelphia in December, 1960. Each investigator presented one or more papers and participated in the panel discussions which followed each series of papers on a given subject. The discussions were transcribed from tape recordings and were edited by the editors of this volume. The biochemical, pathological, and immunological abnormalities were discussed at the beginning of this symposium. Subsequently, the participants discussed the pharmacology and metabolic actions of anti-inflammatory steroids. In the last 2 days of the symposium, the use of various anti-inflammatory agents in the therapy of the collagen diseases was discussed. This symposium should be of value for several reasons, including its large number of references to related areas, as a summarizing source of information about connective tissues and their diseases.

Proceedings of the Thirteenth International Congress on Occupational Health. New York: July 25–29, 1960. Publications Chairman, DR. NORMAN PLUMMER. New York: Book Craftsmen Association, Inc., 1961. 1005 pp.

The papers printed here represent 3 years of important research and measure the growth of industrial medicine in all its related aspects. Close to 300 papers were presented during the 35 sessions of the Congress. These papers are grouped under ten main sections. These sections are logical, basic subdivisions of the total field of occupational health. Each of these sections in the Proceedings is prefaced by a short definition of the subject area and its relationship to the total field.

Proceedings of the Fourth National Cancer Conference. Under Co-Chairmanship of HARRY M. NELSON and MICHAEL B. SHIMKIN. Philadelphia: J. B. Lippincott Company, 1961. 769 pp. $9.00.

This conference, held at the University of Minnesota, September 13-15, 1960, was sponsored by the American Cancer Society, Inc., and the National Cancer Institute, U.S.P.H.S. The addresses, remarks, scientific papers, and discussions of this important conference were edited and are presented in this volume.

Quinones in Electron Transport. Ciba Foundation Symposium. Edited by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR. Boston: Little, Brown & Company, 1961. 427 pp. $11.00.

This symposium was held May 11–13, 1960, and was attended by 29 participants. It was chaired by Dr. Karl Folkers, and nineteen formal papers were presented and discussed.

Virus Meningo-Encephalitis. Ciba Foundation Study Group No. 7. Edited by G. E. W. WOLSTENHOLME and MARGARET P. CAMERON. Boston: Little, Brown & Company, 1961. 118 pp.

This conference was held September 27, 1960, and attended by 24 participants. Thirteen formal papers were presented and discussed.

Atlas of Human Anatomy. By FRANZ FROHSE, MAX BRODEL, and LEON SCHLOSSBERG. 6th ed. New York: Barnes & Noble, Inc., 1960. 167 pp. $2.95 (paper).

This pocket-size paper edition contains a complete set of reproductions of Frohse-Brodel wall charts, Dr. Schlossberg's supplementary charts, explanatory text material, ten special color charts of the endocrine system, 22 scale drawings showing enlarged microscopic sections—their cells and blood vessels, and numerous line drawings. It is designed as a convenient reference work for the medical practitioner and the layman.

Family Growth in Metropolitan America. By CHARLES F. WESTHOFF, ROBERT G. POTTER, JR., PHILLIP C. SAGI, and ELLIOT G. MISHLER. Princeton, New Jersey: Princeton University Press, 1961. 425 pp. $10.00.

This book summarizes the outcome of the first phase of continuing research centered in Office of Population Research of Princeton University. Interviews with 1,165 metropolitan couples who had a second child by September, 1956, provided the underlying data. In this volume variations in attitudes toward fertility and in aspects of fertility performance to date are analyzed for couples at a critical milestone in family building—the birth of the second child. The continuing program will record and analyze subsequent fertility behavior and attitudes of these same couples. The findings of this study are designed to give a fuller understanding of the relationship between fertility-planning behavior and such variables as socio-economic status, social mobility aspirations, adherence to traditional values, interest in religion, marital adjustment, amount of education, and feelings of personal adequacy.

Books Received

The Adolescent Society. By JAMES S. COLEMAN. New York: The Free Press of Glencoe, Inc., 1961. 329 pp. $6.95.

The Image of Love. Modern Trends in Psychiatric Thinking. By CLEMENS E. BENDA. New York: The Free Press of Glencoe, Inc., 1961. 201 pp. $5.00.

Psychoanalysis of the Prostitute. By MARYSE CHOISY. New York: Philosophical Library, 1961. 138 pp.

The Dreams of Reason. Science and Utopias. By RENE DUBOS. New York: Columbia University Press, 1961. 167 pp. $5.00.

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Research in the Service of Medicine

1. Newman, E. V.: Proceedings of a Conference on the Clinical Use of Anabolic Agents: Discussion, Chicago, Searle Research Laboratories, 1956, p. 44.

2. Brown, S. S.; Libo, H. W., and Nussbaum, A. H.: Norethandrolone in the Successful Management of Anorexia and "Weight Lag" in Children, Scientific Exhibit presented at the Annual Meeting of the American Academy of Pediatrics, Chicago, Oct. 20-23, 1958.

3. Watson, R. N.; Bradley, M. H.; Callahan, R.; Peters, B. J., and Kary, R. C.: A Six-Month Evaluation of an Anabolic Drug, Norethandrolone, in Underweight Persons: 1. Weight Gain, Am. J. Med. 26:238 (Feb.) 1959.

MEDICAL EDUCATION NEWS

from the Medical Schools

Canadian Named Dean at Vermont

Dr. ROBERT J. SLATER, a member of Toronto University's department of pediatrics, has been named Dean of the University of Vermont College of Medicine. Dr. Slater fills the position formerly held by Dr. GEORGE A. WOLF, Jr., now of Tufts New England Medical Center.

Dr. Robert J. Slater

The 38-year-old physician received his M.D. degree from the University of Toronto in 1946 and served an internship there during 1946-47. Dr. Slater spent the following year at the university as a National Research Council Fellow in the department of biochemistry and in 1950 moved to The Hospital of the Rockefeller Institute for Medical Research (New York City) where he was assistant physician. In 1954 he served as a Fellow in pediatrics at Cornell University Medical College and in 1955 returned to Toronto as Research Associate at the Research Institute and the Hospital for Sick Children.

Author of numerous publications and a member of several Canadian medical societies, Dr. Slater is past president of the Canadian Society for Clinical Investigation.

He expects to assume his new post January 1, 1962.

Alabama

Plans are now being completed for Alabama's new 100-bed Psychiatric Unit to be located in the University Medical Center. According to Dr. ROBERT C. BERSON, Dean and Vice President for Health Affairs, a primary function of the Psychiatric Unit, in addition to serving the emotionally disturbed, is the teaching aspect. Training for vitally needed psychiatric personnel, including doctors and nurses, will be one of the chief duties of the hospital unit. It is anticipated that when in full operation, 20 to 24 psychiatrists will be in training on a continuing basis. The physicians will have completed their internship in an accelerated hospital and will be following the Medical College and University Hospital 3-year specialty training program in psychiatry. Construction is expected to begin in mid-1962.

Albany

With more and more college courses available on television, Albany Medical College turns instead to radio to pre-

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MEDICAL PHYSIOLOGY

Edited by Philip Bard—Written by 16 Contributors

The new 11th edition of this classic is unmatched for its scientific accuracy and for its up-to-date and comprehensive treatment of the subject. Every section in MEDICAL PHYSIOLOGY has been written and revised by 16 foremost physiologists and educators to give this text an almost newsworthy quality in its review of current physiologic research. Entirely redesigned in a new, two column format, this edition contains 508 illustrations, including 70 new ones, and an extensive bibliography. You'll find no sacrifice of detail and no attempt to minimize controversial matters in this classic work.

Edited by PHILIP BARD, Professor of Physiology, The Johns Hopkins University. With 15 collaborators. Published August 1961. 11th edition, 1339 pages, 7¼" x 10½", 508 illustrations, 4 in color. Price, $16.50.

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PATHOLOGY

Edited by W. A. D. Anderson—Written by 35 Contributors

The new 4th edition of PATHOLOGY is the most up-to-date, authoritative and comprehensive textbook you can recommend to students. W. A. D. Anderson, M.D., and 34 eminent contributors have extensively revised this edition and have added chapters on hypersensitivity diseases, including the so-called collagen diseases and on mesenchymal tumors of soft tissues. The authors give special attention to radiation effects, viral diseases, tropical and parasitic diseases, and oral and dental diseases. The book is printed on a new, larger page to increase legibility, and it is arranged in two sections for easier use. With a total of 1392 illustrations, including 90 new ones, this textbook continues to be the most profusely and most effectively illustrated book on the subject.

Edited by W. A. D. ANDERSON, M.A., M.D., F.A.C.P., F.C.A.P. Written by 35 contributors. Published August 1961. 4th edition, 1389 pages, 7¼" x 10½", 1385 illustrations, 7 color plates. Price, $18.00.

Just Published! Goth

MEDICAL PHARMACOLOGY

This volume provides a new approach to the problem of equipping medical students with the sound understanding of principles and concepts of pharmacology that can guide them in making intelligent therapeutic decisions. While eliminating extensive descriptions of etiology, prognosis and therapy of diseases, this new book concentrates on the actual mechanism of the diseases and the reaction of the drug on a specific tissue, organ, or system of the body.

By ANDRES GOTH, M.D., Professor of Pharmacology and Chairman of the Department, The University of Texas Southwestern Medical School, Dallas, Texas. Published May 1961. 551 pages, 6¾" x 9¾". Price, $11.00.

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sent postgraduate medical instruction to practicing physicians. Doctors in 30 cities and towns in New York State and New England will participate in the college's 7th season of two-way radio medical conferences, which began Oct. 3. An estimated 1200 physicians will take part in the conferences, utilizing two-way radio facilities located at hospitals in their communities. A record 38 hospitals are enrolled in the network this year. It is anticipated that another 1200 or more doctors will listen to the conferences over FM radios in their homes, offices, or autos. The radio conferences, which were conceived by the college to combat the time and travel factors that frequently prevent physicians from attending postgraduate medical meetings and courses, are designed to cover a variety of medical and surgical topics, offering pertinent and up-to-date information in each of these fields. They are broadcast three times a week, 24 weeks a year, Oct., through March.

Dr. FRANK M. WOOLSEY, Jr., Associate Dean and chairman of the department of postgraduate medicine, developed and directs the two-way radio conference network.

Bowman Gray

Dr. HOWARD H. BRADSHAW, professor and chairman of the department of surgery, has been awarded the American College of Surgeons' Distinguished Service Award of 1961. The honor was conferred upon Dr. Bradshaw at the annual meeting of the College Oct. 5 in Chicago, Ill. Dr. Bradshaw has been professor and chairman of the department of surgery at Bowman Gray since 1941.

Chicago Medical

Dr. ROBERT KELLOGG CRANE, associate professor of biochemistry at Washington University (St. Louis) Medical School, has been named professor and chairman of the department of biochemistry at the Chicago Medical School. According to Dr. JOHN J. SHEININ, president of the school, Dr. Crane will head a department that will have greatly expanded facilities, occupying a full floor of the school's block-long new Institute for Medical Research. Crane joined the Washington University faculty in 1950, after taking his Ph.D. from Harvard University and spending a year as assistant biochemist at the Biochemical Research Laboratory of Massachusetts General Hospital, Boston. He recently returned from Moscow, where he attended the Fifth International Congress on Biochemistry.

U. of Chicago

Numerous changes in administrative positions at the University of Chicago have placed Dr. LOWELL T. COGGESHALL as Vice-President of the University. Dr. Coggeshall's former title was Vice President for Medical and Biological Sciences. In his new position he will assume broader academic and administrative responsibilities in the university.

RAY E. BROWN, who formerly held the title of superintendent of the University of Chicago Hospitals, has been named Vice President for Administration of the university. In this capacity he will act as the university's chief financial officer. Brown will continue to hold academic responsibilities as professor on the faculty of the Graduate School of Business and director of the Graduate Program of Hospital Administration conducted by the university.

Dr. GEORGE W. BEADLE's title has been changed from Chancellor to President of the University.

A new 100-bed children's hospital,

which will replace two smaller children's hospitals, will be built at the university. Construction of the $2 to $2.5 million building is scheduled to begin early next year with completion set for 1963. Ray E. Brown disclosed that an extensive study of Chicago area needs and long-term trends in children's care was the basis for the decision to construct the new facility. When the new hospital is completed, Bobs Roberts hospital will be used for expansion of children's outpatient clinics and for added laboratory and office space. The present six story Home for Destitute Crippled Children will also be used for laboratory and office space.

Cincinnati

Heading a United States survey team, Dr. JOHN F. MUELLER, associate professor of medicine, left Oct. 1, for Burma to make a study there of the population's nutritional health. At the request of the Burmese government, the study will be made under the auspices of the U. S. Department of State and the National Institutes of Health. The team's study of the country's major nutrition problems will take them to seven areas throughout the Asiatic nation, including a visit with Dr. Gordon Seagrave, the "Burma Surgeon" at his hospital at Nanmkham. Following the team's return to this country Dec. 22, practical recommendations for maximum utilization of Burma's own food resources will be made.

Duke

One thousand persons turned out for a testimonial dinner recently honoring Dr. WILBERT C. DAVISON, retired dean of the Duke University Medical School. The affair was held in connection with the university's Symposium on the Commonwealth for Children, Oct. 4-8. Both the dinner and Symposium honored Dr. Davison, who headed the Duke Medical School faculty for a third of a century. Principal speaker at the event was Dr. STANHOPE BAYNE-JONES, former Yale Medical School dean and currently a member of the Army Scientific Advisory Committee.

Georgetown

Dr. CHARLES D. SHIELDS, professor and chairman of the department of physical medicine and rehabilitation, has been appointed executive director of Georgetown University Hospital. The Very Reverend EWARD B. BUNN, S. J., President of the university, said that the newly created post was necessitated by the growing complexity of the hospital's activities, the increasing size of the staff, and the multiplicity of its functions. Dean HUGH H. HUSSEY of the School of Medicine will have supervision and direction of medical teaching and will be responsible for research activities sponsored by the school.

Harvard

A gift of $500,000 from the Children's Hospital Medical Center will enable the university to establish the Bronson Crothers Professorship of Neurology. The chair will honor a leader in the treatment of neurological diseases of childhood. At the time of his death in 1959, Dr. Crothers was clinical professor of pediatrics emeritus at the Harvard Medical School, and neurologist at The Children's Hospital. The gift to Harvard marks the first time that one of the medical school's seven associated teaching hospitals has provided the endowment required to establish a professorship. An anonymous gift to the Children's Hospital made the endowment possible.

The professor selected for the new chair will serve simultaneously at The Children's Hospital as neurologist.

No. 2 in a descriptive series on Abbott specialties

New oral antianemia therapy can be given on empty stomach

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In view of factors which adversely affect iron absorption, it has been said: ". . . therapeutic iron should be given on an empty stomach."[1] But, in the past, this often meant side effects such as nausea, abdominal pain, diarrhea or constipation, and even heartburn.

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Nicotinamide	30 mg.
Pyridoxine Hydrochloride	5 mg.
Calcium Pantothenate	10 mg.
Plus Vitamin C	
Ascorbic Acid	150 mg.

1. Woodruff, C. W., "Iron"; Borden's Review of Nutrition Research, 20:61, 1959.

Filmtab—Film-sealed tablets, Abbott; U.S. Pat. No. 2,881,085.
Gradumet—Controlled-release form, Abbott; U.S. Pat. No. 2,987,445.
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*In controlled-release dose form.

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ABBOTT

Kansas

Dr. GILBERT S. GREENWALD has been appointed to the research professorship in human reproduction at the university medical center. He succeeds Dr. THOMAS H. CLEWE, now at Vanderbilt University. Dr. Greenwald was a research fellow in the U. S. Public Health Service prior to five years of teaching at the University of Washington, Seattle, in the department of anatomy.

Louisville

Dr. CHARLES F. BLANKENSHIP, who has served as a regional health director for the U. S. Public Health Service in San Francisco since 1956, will join the Louisville medical faculty as acting chairman of the department of community health. He succeeds Dr. RUSSELL TEAGUE, recently resigned.

Minnesota

Dr. JOHN SPIZIZEN, former associate professor of microbiology at Western Reserve University, became professor and head of the newly named department of microbiology in the College of Medical Sciences on Oct. 1. He succeeds the late Dr. JEROME T. SYVERTON, who headed the university's department of bacteriology from 1948 until his death in January, 1961.

Dr. CECIL J. WATSON, head of the department of medicine, recently received the distinguished service award of the Minnesota Medical Foundation. Watson was the third recipient of the award, established last year. He will receive $5,000 a year until he retires. Drs. MAURICE B. VISSCHER and OWEN H. WAGENSTEEN received similar awards last year.

A. U. S. Public Health grant of $3,136,550 has been awarded to the university's heart research program over the next seven years. The money will be used to establish a clinical cardiovascular research center. According to Dean ROBERT B. HOWARD, the center will be integrated within existing departments of the medical school now engaged in heart study. The grant ultimately will provide places for seven additional professors and 10 assistant professors on a permanent basis, and for several research assistants, Howard said.

New York Medical College

Plans for the construction of a new $6 million research building by New York Medical College, Flower and Fifth Avenue Hospitals, to serve that institution and the entire Metropolitan Hospital Center which the college staffs, were announced recently by Dr. RALPH E. SNYDER, President and Dean. The building is called the first step in a $25 million construction program intended to develop the college into a medical university within the next 10 years, with a cardio-pulmonary institute, graduate-college building, and a new student residence. Groundbreaking ceremonies for the 10-story structure will be held in December, with completion expected early in 1963.

Dr. JOHN W. HARRISON has been named Assistant Dean in charge of administering the college's fourth year program of "student internships."

Two new department chairmen were named recently to the medical faculty. Dr. MILTON LOWENTHAL was named chairman of physical medicine and rehabilitation, and Dr. ARTHUR A. MICHELE was named chairman of orthopedic surgery. Dr. Lowenthal, who has been on the staff of the college since 1950, succeeds Dr. JEROME S. TOBIS as department chairman. Dr. Michele was previously associate clinical professor of orthopedic surgery at the college center. He was one of 13 orthopedic surgeons who last year undertook an

educational and treatment program in Jordan under the auspices of MEDICO and the U. S. Welfare Relief Agency. He will participate in a similar program in Colombia, S. A. this year.

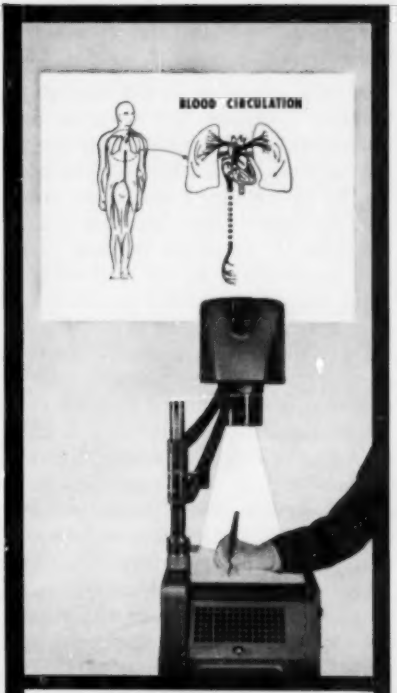
New York University

IRVIN G. WILMOT has been appointed administrator of the New York University Hospital. He was formerly assistant superintendent of the University of Chicago Clinics, associate director of the graduate program in hospital administration and assistant professor of the Graduate School of Business at the University of Chicago. Wilmot will be the first administrator of the newly erected University Hospital which is scheduled to open for occupancy in the fall of 1962. It will replace the present University Hospital and will complete the $50 million construction program of the New York University Medical Center, which began in 1948.

North Carolina

Dr. CLAYTON E. WHEELER Jr., has been named chief of the division of dermatology and professor of dermatologic medicine. Dr. Wheeler joins the UNC faculty from the University of Virginia School of Medicine. He will report to his new post about the middle of the current academic year.

The UNC School of Medicine has now entered the field of radio for broadcasting educational programs to physicians meeting as organized groups in local hospitals, with provision being made for these groups to ask questions of the speakers through a conference telephone hook-up. Supported by a grant from Merck Sharp and Dohme, the medical postgraduate program was inaugurated Oct. 24, and will continue for 23 weeks.



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Ohio State

A new approach to the education of hospital dietitians will be tried by the university's College of Medicine with the support of a $267,452 grant from the W. K. Kellogg Foundation over the next six years. Starting this year, approximately 10 young women who are now sophomores at the university will enter the experimental program under the supervision of the school's department of preventive medicine. According to a university spokesman, the pilot program is designed to prepare professional hospital dietitians in a shorter time and in larger numbers. University officials say it will combine in four years a broad liberal education, sound training in dietetics, and will integrate basic science training with the clinical experience of medical dietetics in a hospital environment. Enrollment in the experimental program is to be enlarged to 40 in the autumn of 1962.

Pittsburgh

F. NORMAN BRIGGS, associate professor of physiology at Tufts University School of Medicine, has been appointed professor of physiology. He will serve in the recently-created department of physiology headed by Dr. ERNST KNOBIL.

Rochester

A new seminar course in biomedical engineering was recently established at the university under a five-year National Institutes grant of $254,407. The course, which began this fall, will be conducted by Dr. DANIEL W. HEALY, chairman of the department of electrical engineering and by Dr. LEE B. LUSTED, professor of biomedical engineering and associate professor of radiology at the medical center. The program of graduate studies will lead to the Ph.D. degree in engineering with special application to the fields of medicine and the life sciences. Students will be trained for careers in industrial research, for work in research centers, and for university teaching and research.

Temple

Two new posts have been created at the School of Medicine. Appointed assistant dean for research is Dr. BERT R. BOONE, a veteran of 30 years duty in the U. S. Public Health Service. Former head of a special section of the National Heart Institute, Dr. Boone administered the Research Fellowship Unit in the Grants and Training Branch prior to his retirement last June.

The other new post, assistant dean for student affairs, has been filled by Dr. ARTHUR D. NELSON, a practicing physician in the Philadelphia area and former military engineer. Dr. Nelson, an alumnus of Temple's medical school, also has served on its faculty in the department of public health and preventive medicine.

Western Reserve

The American Heart Association presented its first Research Achievement Award to Dr. CHARLES H. RAMMELKAMP "for his many contributions to knowledge of the prevention and management of streptococcal infections, rheumatic fever and rheumatic heart diseases." Dr. Rammelkamp, professor of medicine and associate professor of preventive medicine, received the honor at the Association's annual meeting in Bal Harbour, Fla., recently. The Research Achievement Award, which includes an honorarium of $1,000, was established this year by the American Heart Association. It will be presented annually for outstanding research in the field of heart and blood vessel diseases.

from the National Institutes of Health

Report Says 80% of Mental Health Trainees Are in 'Core Disciplines'

Of 2,526 graduate training grants supported by the National Institute of Mental Health in 1960, 80% were in core mental health disciplines, according to a recent program analysis report. Institutions in 10 States made two-thirds of the appointments, and one-third of the trainees were located in the Northeastern U. S.

Appointments in core disciplines included 26.3% for graduate training in psychiatry, 18.0% in clinical psychology, 25.8% in psychiatric social work, and 10.8% in graduate psychiatric nursing. Other training areas included psychiatric residency training for general practitioners; non-clinical psychology; non-psychiatric social work; public health for mental health professionals, biological and social sciences, and special programs in juvenile delinquency and mental retardation. Fifty-seven percent were new appointments.

One-third were in the 25-29 year age group, while 80% were 20 to 34 years old. General practitioners training in psychiatry averaged 40.6 years of age. Sixty percent were male, though a majority of psychiatric social workers and psychiatric nurses were women. Average annual stipends ranged from about $2,000 (exclusive of tuition and fees) for social workers to more than $4,500 in some of the smaller programs. General practitioners training in psychiatry averaged above $10,000.

Degree levels of non-medical trainees varied. Forty percent of psychology trainees held master's degrees or higher. Less than 15% in psychiatry nursing and social work had attained master's degrees or doctorates.

NOTE: Readers desiring copies of publications mentioned in this section of *J. Med. Educ.*, may, unless otherwise noted, obtain them as well as additional information on any subject reported herein, by addressing their requests to the Office of Research Information, Room 115, Bldg. T-19, National Institutes of Health, Bethesda 14, Md.

Flexibility, Anticipating Future Needs, Stressed in New Lab Designs

The present trend in the design of research laboratories emphasizes maximum flexibility to meet the anticipated demands of research in the future. This trend, as exemplified in planning for new research facilities at the National Institutes of Health in Bethesda, Maryland, the Communicable Disease Center near Atlanta, Georgia, and in the Food and Drug Administration's new buildings in Washington, was discussed during a meeting of laboratory design experts at NIH last month. Design engineers from the Public Health Service, Food and Drug Administration, and the National Academy of Sciences attended the two-day seminar sponsored by the NIH Research Facilities Planning Branch. It was the first meeting of such a group of design engineers to exchange information about the planning problems they share in common.

The NIH Research Facilities Planning Branch provides informational and advisory services to medical schools and other research institutions as well as addressing itself to problems generated by the National Institutes of Health's continued growth.

Two New Publications Now Available from NIH

Two new publications available through the National Institutes of Health are "Careers in Psychiatry" and "The Normal Volunteer Program of the NIH Clinical Center."

Training and career development opportunities open to physicians and psychiatrists in, or wishing to enter, the Public Health Service mental health program are outlined in "Careers in Psychiatry." Information includes descriptions of location and types of mental health programs carried out by PHS, methods of candidate selection, major phases of the program, and the pay scale and residencies available.

The contribution of normal volunteers to the clinical research mission of the National Institutes of Health is described in the second booklet. Defined as "a person . . . in excellent health . . . admitted to the Clinical Center in order to serve as a volunteer subject for approved research projects," the normal volunteer serves as a normal control, or standard, in research designed to extend knowledge and understanding of the causes, prevention, and treatment of disease. Selection of volunteers, benefits, living conditions, and examples of research projects using the volunteers are described.

Single copies of both publications are available without charge from the Office of Research Information, Room 115, Bldg. T-19, National Institutes of Health, Bethesda 14, Maryland.

Lipid Committee Formed to Spur Production of Research Compounds

The National Institutes of Health has established a Lipid Advisory Committee to stimulate private laboratories to produce more and purer compounds for lipid research.

Action follows recognition by the National Advisory Heart Council of growing needs for pure compounds in kilogram quantities, pure radioactive compounds of high specific activity, and reference standards for gas chromatography and other laboratory purposes.

Through contracts with private laboratories to produce and distribute the compounds, the Committee hopes to provide investigators in the field with lipid research materials not presently available in sufficient quantity at prices consistent with economic research. Eventual goal is to put commercial production on self-sustaining basis.

Mixtures of pure fatty acid methyl esters and pure unsaturated fatty acid methyl esters are already available to qualified scientists for use as reference standards in lipid analysis. Adequacy of current supplies of radioactive lipid materials is now being studied.

Committee members are: Drs. E. H. AHRENS, JR., Rockefeller Institute for Medical Research; E. C. HORNING, Baylor University College of Medicine; F. H. MATTSON, Miami Valley Laboratories, Procter and Gamble Co., Cincinnati; J. F. MEAD, University of California Medical Center at Los Angeles; D. A. TURNER, Sinai Hospital, Baltimore; and W. H. GOLDWATER, Division of Research Grants, NIH, Committee project officer.

Names in the News

Dr. HERBERT A. SOBER, Chief of the Laboratory of Biochemistry, National Cancer Institute, has been appointed one of nine associate editors of *Biochemistry*. This new scientific journal will be published by the American Chemical Society six times a year, beginning January 1962. Editor is Dr. HANS NEURATH, Chairman of the Biochemistry Department of the University of Washington.

Dr. FRED ALT, Chief of the Instrument

Engineering and Development Branch, National Institutes of Health, has been selected by Instrument Society of America to organize a Biomedical Sciences Division and act as Director Pro Tempore. Another sign of the growing national importance of biomedical instrumentation engineering, the new ISA Division plans to represent professional engineers in all important areas of biomedical instrumentation engineering; electronics, optics, thermodynamics, mechanical, sanitary, and chemical engineering.

Items of Current Interest

Dr. Hyde Takes Over AAMC Division of International Medical Education

The AAMC's new Division of International Medical Education (DIME) is now firmly established with the arrival of Dr. HENRY VAN ZILE HYDE as Director.

Dr. Hyde

Dr. Hyde comes to the AAMC from the U. S. Public Health Service where he was assistant to the Surgeon General for International Health. In his new position, Dr. Hyde will be responsible for the development and operation of DIME, which was created at AAMC headquarters with funds provided by the Rockefeller Foundation.

A graduate of Yale University, Dr. Hyde received his medical degree from Johns Hopkins University School of Medicine and has served on the faculties of the Universities of Rochester and Syracuse, Albany Medical College and the Schools of Public Health at Harvard and Johns Hopkins.

Dr. Hyde's experience in international medical affairs began in 1944 when he was appointed director of the Medical Division of the Middle East Supply Center in Cairo, Egypt. In 1945 he was named chief of the Health Division of the United National Rehabilitation and Relief Agency—Balkan Mission, and two months later became chief of the Middle East Office of UNRRA. He then moved on to the State Department's Division of International Labor, Social and Health Affairs where he was appointed assistant chief of the Division of International Health, and in 1950 took over the directorship of the Division of Health and Sanitation, the Institute of Inter-American Affairs; following which he was chief of the Health Division of the Technical Cooperation Administration (Point IV). Hyde returned to the Division of International Health in 1953 as chief.

Dr. Hyde has been the U.S. member of the Executive Board of the World Health Organization since its inception, having been appointed by Presidents Truman, Eisenhower, and Kennedy. He continues to hold this position. He has also been a member of the U.S. Delegation to each of the 14 World Health Assemblies of the WHO.

Hyde is no stranger to the AAMC as he has served on its Committee on International Relations in Medical Education since 1957.

The primary goal of the Division of International Medical Education is to assist medical schools and their faculties in determining and effectively de-

veloping their role in world affairs. It will provide service to AAMC members, not carry out programs of its own.

"The Division has been created on the assumption that all medical educators and schools wish to make their maximum contribution to the solution of the grave problems confronting us as a nation," said Dr. Hyde. And added, "medical education must first meet our expanding national needs in order to keep the U. S. strong. It must at the same time play a growing role in these urgent times in helping less advanced nations build their internal medical strength."

Ninth Annual AAMC Institute to Meet in December

"Research and Medical Education" will be the general topic for discussion at the ninth annual AAMC Institute, to be held Dec. 3-7 at The Broadmoor in Colorado Springs, Colo. The major areas to be explored by approximately 180 participants from the medical schools and agencies concerned with research and education are: the impact of increasing emphasis on medical research upon the medical school faculty, students, and curriculum; the effect of increasingly available research funds upon the utilization of medical school facilities and the financial structure of the school; the effects of increased research emphasis upon the type, amount, and quality of medical research that is being done; and the impact of a "research-oriented" atmosphere upon the long-range goals of the medical school and the university as important components of our society.

Dr. Julius H. Comroe, Jr., Director of the Cardiovascular Research Institute at the University of California Medical Center, who served as chairman of the First AAMC Teaching Institute in 1953, led the planning for this year's meeting.

In general sessions and in group discussions, the Institute, as in the past, will aim to provide a forum through which medical faculty members can exchange views on a problem of major significance to medical education. Although no specific resolutions will be passed, medical faculties' views on the role of research in medical education and on policy and planning for future utilization of research funds will be made known in the report of the Institute proceedings.

Among the guest speakers are: Dr. Sidney Hook, professor of philosophy at New York University; Dr. Theodore T. Puck, professor of biophysics at the University of Colorado School of Medicine; Dr. H. Stanley Bennett, dean of the Division of Biological Sciences at The University of Chicago; and Dr. Frederick C. Robbins, professor of pediatrics at Western Reserve University School of Medicine.

Chairmen of the subcommittees responsible for organizing Institute content include Dr. Julius B. Richmond, SUNY Syracuse; Dr. Robert H. Alway, Stanford; Dr. George E. Miller, Illinois; Dr. Paul J. Sanazaro, University of California at San Francisco; Dr. Charles V. Kidd, National Institutes of Health; and Dr. Herbert E. Longenecker, of Tulane University.

The Institutes have been an annual activity of the AAMC Committee on Research and Education; its administration is coordinated by Dr. Helen Hofer Gee, director of research.

The Institute report is scheduled for publication in *The Journal of Medical Education* early in 1962.

NSMR Headquarters Shifted to Rochester, Minn.

The National Society for Medical Research has moved from Chicago, Ill., to Rochester, Minn. The Society's new address is now 111 Fourth St., S.E.

Individual Membership

in the

Association of American Medical Colleges

In recent years the activities of the Association of American Medical Colleges have expanded far beyond the original considerations of administrative problems to the many and varied problems of medical education as encountered by the entire medical school faculty.

The expansion of activities has been due to the growing complexity of medical education —the swift development of the medical sciences, the rapid accumulation of new knowledge to be taught, the pressure for more graduates, the changing patterns of medical care, and countless other factors.

Because of these factors, the AAMC recognizes the need for a professional organization to represent not only the medical schools but the faculty members of these schools. Through the offering of individual membership, the AAMC provides you with the opportunity to exchange ideas, opinions and information through the Annual Meeting, Teaching Institutes, and other activities of the Association.

The AAMC also encourages you to attend the Annual Meeting, not only to meet with others who are teaching in your field and discussing the educational problems that are peculiar to it, but also with the idea of becoming familiar with the entire field of medical education as one of society's most important enterprises. The time has come when teachers of medicine must meet together and discuss the problems and activities that are peculiar to medicine as education just as they are accustomed to meet and talk about medicine as science.

As an Individual Member you are entitled to receive *The Journal of Medical Education*, the only publication devoted exclusively to medical education. The Journal also carries the latest news from the medical schools and provides a valuable service through its Personnel Exchange column. You receive the yearly *Directory*, the Proceedings of the Annual Meetings, and a monthly newsletter which will keep you informed on items of current interest in the field of medical education, both nationally and internationally.

Individual Membership, at only $10 a year, is open to any person who has demonstrated a serious interest in medical education over a period of years. All the privileges of membership and a provisional membership card are granted immediately after payment of the $10 fee, although confirmation must await official action at the next Annual Meeting.

To obtain membership, fill out the application form below, append check for $10, and return to the Association's central office at 2530 Ridge Ave., Evanston, Ill.

INDIVIDUAL MEMBERSHIP APPLICATION

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

2530 Ridge Ave., Evanston, Ill.

Name:_____

Mailing Address:_____

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(City) (Zone) (State)

Field of medical education in which chief interest lies:_____

_____

College or other connection:_____

_____

Lower costs, better accommodations for work, and fuller utilization of the leadership of the Society's new president, Dr. Hiram E. Essex of the Mayo Foundation, were the three main reasons given for the move.

New Fund Names Educator as President

Dr. John T. Cowles resigned as professor of psychology and director of planning for the health professions, the University of Pittsburgh, to accept the presidency of the new Maurice Falk Medical Fund. The Fund was established recently for the purpose of furthering medical care, education and research. The Fund's initial principal consists of an endowment of $5 million granted by The Maurice and Laura Falk Foundation of Pittsburgh.

Dr. Cowles is a graduate of Princeton University and from Yale University where he took his doctorate of philosophy in psychobiology. He has studied also at the University of Minnesota, conducted post-doctoral research at the University of California, and taught psychology at the University of Illinois and Princeton.

Dr. Cowles has served on advisory committees to the Association of American Medical Colleges and to the Public Health Service.

AHA Names New Officers

The American Hospital Association held its annual meeting in Atlantic City, N.J., Oct. 25-29, and installed Dr. Jack Masur, director of the Clinical Center at the National Institutes of Health, as president for a one-year term. He succeeds Frank Groner, administrator of Baptist Memorial Hospital, Memphis, Tenn.

In other action, the group elected Dr. T. Stewart Hamilton as president-elect. Dr. Hamilton is director of the Hartford Hospital in Hartford, Conn.

Merck Aids Residents and Interns

More than 100 resident physicians and interns in teaching hospitals received financial assistance from the George W. Merck Memorial Loan Fund in its second year of operation, according to a recent announcement by The Merck Company Foundation. Seventy per cent of the loans went to residents, who generally have greater family responsibilities than interns and hence encounter more financial emergencies, the report said.

Nineteen medical schools participate in the Fund, established to encourage deserving interns and residents to seek the best possible postgraduate training. The loans to residents and interns are granted by and repaid to each participating school on terms prescribed by its dean.

Share Your Journals

The United States Committee of The World Medical Association is sponsoring a project to send used medical journals to physicians in Asia. Specialty journals are needed, particularly *The Journal of Medical Education.*

If you wish to participate in this doctor-to-doctor program, please write to The World Medical Association, United States Committee, 10 Columbus Circle, New York 19, N.Y., listing the journal or journals you wish to contribute.

Pediatricians Elect Dr. Fischer

Dr. Carl C. Fischer of Philadelphia was elected president of the American Academy of Pediatrics at the annual meeting of the scientific society of child specialists held recently in Chicago. He succeeded Dr. George M. Wheatley of New York City.

Dr. Clarence H. Webb, Shreveport, La., was elected vice-president, an office that is also called "president-elect" because of automatic succession arrangements.

Dr. Fischer, the new president, is professor and head of the department at

Hahnemann Medical College of Philadelphia. He also serves as director of health services for Girard College.

In another session at the meeting, two medical professors won E. Mead Johnson Awards for outstanding research in child health. Dr. Lytt I. Gardner, department of pediatrics at State University of New York Upstate Medical Center; and Dr. Donald E. Pickering of the University of Oregon Medical School, received the recognitions from Dr. George M. Wheatley, president of the Academy.

Hartford Named Executive Director of Military Surgeons

Deputy Surgeon General of the Army, Maj. Gen. T. J. Hartford became Executive Director of the Association of Military Surgeons of the United States upon his retirement from the Army Sept. 30, after more than 30 years service.

General Hartford will coordinate and direct the worldwide activities of the Association, whose headquarters are located in Washington, D.C.

PERSONNEL EXCHANGE

Faculty Vacancies

INTERNIST: To direct Pulmonary Disease Section of a large general hospital closely affiliated with medical school. Faculty appointment. Broad clinical, research, and teaching opportunities. Active Pulmonary Function Laboratory. Contact: Chief, Medical Service, V.A. Hospital, Albany, N. Y.

MEDICAL SERVICES DIRECTOR: To have full charge of all medical and surgical activities for Kern County General Hospital System, under administrative direction of Hospital Administrator; direct and coordinate medical services, supervise operation of intern and resident teaching programs. M.D. degree from approved medical school, approved internship, completion of approved residency and three years experience in practice of medicine, two years of which must have been in teaching or supervisory capacity. Certification by an American Board. California M.D. license. Salary $15,228 to $18,504 annually. Write to: C. Leon Bryson, Kern County General Hospital, 1830 Flower St., Bakersfield, Calif.

RADIOLOGIST: To assist staff radiologist in operation of X-ray department at Kern General Hospital including supervision of technical employees, assisting in resident physician training. Active department. Possession of valid license to practice medicine in California required; certification or eligibility for certification by American Board of Radiology is desirable. Salary $11,928 to $14,508. Write to: Kern County General Hospital, 1830 Flower Street, Bakersfield, Calif.

MEDICAL EDUCATION DIRECTOR: Board Certified or comparable to requirements for Board Certification to direct an approved internship and residency program. Two hundred sixty-six bed community hospital with medical school affiliation in University City. Write and include curriculum vitae: Arthur V. Crandall, Administrator, Brackenridge Hospital, Austin, Texas.

BACTERIOLOGIST: University Hospital has a vacancy for a medically qualified bacteriologist. Appointment also carries a university teaching position. Salary $10,000-$14,000 per annum. Applicants should have hospital experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, Canada.

MEDICAL TECHNOLOGIST: ASCP Registered medical technologist (female) with Bachelor's degree and 2 years experience to work in curriculum of medical technology, department of pathology. Position is chiefly assisting in administration and teaching. Salary open, dependent upon qualifications. Reply: Dr. J. F. Kuzma, Director of Department of Pathology, Marquette University School of Medicine, Milwaukee 3, Wis.

MEDICAL LIBRARIAN: University desires Medical Librarian at an initial salary of $6,500. The successful candidate will receive faculty status equivalent to that of departmental chairman in the Faculty of Medicine. Duties will include full responsibility for the administration of the Medical Library. Minimum qualifications must include the Medical Library Association Grade I certificate, or its equivalent, with some experience in library administration. Applications should be addressed to the Chief Librarian, Macdonald Memorial Library, Dalhousie University, Halifax, Nova Scotia.

BIOCHEMIST: Junior staff position open in expanding biochemistry department of mid-western medical school. Teaching and research. Opportunity for advancement. Salary competitive. Valuable fringe benefits. Address: V-112.

PHYSICIANS: County hospital affiliated with three medical schools, desires qualified full-time physicians for intern and resident teaching and patient care responsibilities in following fields: internal medicine, general surgery, pediatrics, psychiatry, obstetrics and gynecology, radiology, forensic pathology, director of out-patient clinic, and physician experienced in rehabilitation to direct long term medical care program. All starting salaries over $14,000. Include curriculum vitae with inquiry to: F. G. Gillick, M.D., Santa Clara County Hospital, San Jose-Los Gatos Road, San Jose 28, Calif.

PATHOLOGIST: Board certified or Board eligible pathologist for position combining hospital pathology, teaching in school of medicine and research. Applicant should be interested in both clinical pathology and pathologic anatomy. Compensation and rank dependent upon qualifications. For further information address: Theodore L. Perrin, M.D., The Creighton University School of Medicine, 302 N. 14th St., Omaha 2, Nebr.

ANATOMIST: Two positions open; one in gross and one in neuroanatomy. The Ph.D. required in Anatomy, or in Biology with practical experience. Salary and working conditions good; research field optional. Address: V-113.

PHYSIOLOGIST: Full-time appointment. Gastroenterologist or neurophysiologist preferred. Teaching responsibilities with medical, dental, pharmacy, or graduate students; conduct independent research program. Stimulating environment. Rank and salary based on qualifications. Address V-114.

DIRECTOR OF MEDICAL EDUCATION: Full-time for 263-bed regional medical center; progressive midwestern city of 130,000; cooperative medical staff with strong teaching interests and qualifications; long history of community support and emphasis on education. Salary open. Write to S. F. Masson, Director, Rockford Memorial Hospital, 2400 N. Rockton Ave., Rockford, Ill. Enclose curriculum vitae.

CHILD PSYCHIATRIST: For Queen's University and Kingston General Hospital; Kingston, Ontario, Canada. Salary range $7,700-$10,200 and University rank up to associate professor, dependent on experience. Private consulting facilities. For further information, write Dr. R. B. Sloane, Dept. of Psychiatry, Queen's University.

PHARMACOLOGIST: Ph.D. or M.D. Full-time appointment in department of pharmacology as assistant professor. Salary, $6,000-$8,500 according to qualifications. Interested candidates should send a complete curriculum vitae and recent photograph to Dr. M. F. Murnaghan, Professor and Head, Department of Pharmacology, University of Ottawa, Ottawa 2, Ontario, Canada.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

PSYCHIATRIC SOCIAL WORKER: M.A., The University of Chicago. Desires position in medical school, department of psychiatry. Fourteen years experience in teaching medical students in two medical schools as well as administrative and supervisory experience. Address: A-495.

BIOPHYSICIST-PHYSIOLOGIST: Ph.D., M.S., E.E., wishes faculty appointment, teaching and research. Publications, books. Areas of research interest—bioelectric studies, origins of congenital heart disease, biomedical engineering. Address: A-496.

PHYSIOLOGIST-PHARMACOLOGIST: Ph.D., faculty member of medical school. Teaching experience. Research in endocrine physiology and pharmacology of endocrine preparations. Publications and Society memberships. Desires teaching and/or research position with opportunity for independent research. Address: A-497.

MICROBIOLOGIST-IMMUNOLOGIST: Research and teaching experience in bacteriology and parasitology. Presently on medical school faculty. Desires faculty appointment appropriate for qualifications with opportunity for independent research. Would also consider a position in a medical foundation or in a City, County, or Federal Institution affiliated with a medical school. Address: A-498.

PREVENTIVE MEDICINE-PUBLIC HEALTH: Physician with M.D., Dr.P.H. degrees desires senior teaching position on medical school or public health school faculty. Numerous publications. Previous research, teaching, administrative and health department experience. Special interests are epidemiology, preventive medicine, and biostatistics. Address: A-499.

INTERNIST: M.D., M.S. in Med. Certified. Age 46. Wishes to abandon lucrative private practice of 18 years for full-time (or half-time) medical school appointment that includes teaching, OPD, and hospital practice. Extensive clinical experience and original publications in psychosomatic medicine. Capable of organizing and heading a psychosomatic division that will integrate general medicine and psychiatry. Address: A-500.

ANATOMIST: Ph.D. (Anatomy) March 1961. M.S. in Zoology and B.S. in Biology. Age 39, married, child. Presently teaching biology in midwest. Prefers return to anatomy since Ph.D. completed. Twelve years full-time teaching experience, including four in anatomy (histology, embryology, gross, comparative, and neurology). Publications. Research interests in histochemical aspects of mammalian development; program in progress. Prepared to contribute to graduate research training programs. References. Address: A-501.

PHYSIOLOGIST: Ph.D., age 39. Desires faculty appointment, teaching and research. At present associate professor of physiology in medical school. Teaching experience and research in respiratory physiology and neuropharmacology. Salary open. Address: A-502.

PHYSIOLOGIST: Ph.D., age 41. Also E.E. degree in electronics. Wide experience in cardiopulmonary and cardiac electrophysiology as well as medical instrument design. Member of American Physiological Society and Institute of Radio Engineers, etc. Assistant professor of physiology. Seeks faculty position in medical school or in a cardiopulmonary laboratory associated with teaching and research. Address A-503.

PATHOLOGIST: Age 39; Certified (FCAP 1961). Also three years internal medicine. Experienced director of hospital laboratory and director, school of medical technology. Experienced in new laboratory designing. Extensive work in all fields of medical education, recruiting, all medical specialties, research personnel. Interested in cancer research etiology, early diagnosis, genetics, especially leukemias and lymphomas. Prefer establishing laboratories and programs in organizations or institutions, new or in building process. Address: A-505.

BIOCHEMIST: Ph.D., age 50. Will resign as research director of small drug firm for teaching-research appointment. Some medical school teaching experience early in career, but can offer extensive experience to teaching, to research (lipid metabolism; nutrition), and to cooperative projects with clinical and preclinical associates. Desires research or career professorship. Prefers no administrative duties. Address: A-506.

ALLERGIST: Age 40, board certified in allergy and pediatrics. Currently teaching part-time. Seeking full-time teaching position. Address: A-507.

DEVELOPMENT CONSULTANT OR ADMINISTRATOR: Desires position as consultant or administrator for new medical school establishment, or expansion of approved school. Fund raising background capped by six years as Executive Secretary, A.M.E.F. Recently launched program for new Saint Paul Medical School. Address: A-508.

PHARMACOLOGIST-ADMINISTRATOR: Ph.D., age 38. Ten years administrative, teaching and industrial research experience including international as well as Stateside assignments. Research interests in industrial toxicology, neuropharmacology and screening procedures. Teaching experience includes medical, dental, nursing, graduate and postdoctoral duties. Interested in academic administrative post, research coordination and graduate education. Available early in 1962. Address: A-509.

MEDICAL ADMINISTRATOR: M.D., Ph.D. in neurophysiology, neuropharmacology. Experience in administrative clinical research post. Some teaching experience. Strong interest in medical education. Desires either a full-time medical college administrative post or combined with basic science teaching position in physiology or pharmacology. Address: A-510.

INTERNIST: Age 43, board-certified with subspecialty interest in gastroenterology. Extensive teaching and administrative background. Interested in change of location, preferably to the northern half of U.S. Interests predominantly clinical and teaching with some research. Address: A-511.

PHYSIOLOGIST-BIOCHEMIST: Ph.D., age 32. Present rank assistant professor. Experienced with isotopic and biochemical techniques applied to basic problems in endocrinology, metabolism, and cellular physiology. Publications and societies. Extensive teaching experience. Desires career faculty appointment in physiology or biochemistry with opportunity for independent research. Available Spring 1962. Address: A-513.

PEDIATRICIAN: Diplomat; teaching experience; publications. Desires faculty appointment in U.S. medical school. Presently located in Canada. Address: A-514.

MICROBIOLOGIST-INTERNIST: M.D., Ph.D., Qualified medical scientist, age 46, desires full-time position as Chief, Division Infectious Disease and/or Head, Microbiology Department of medical school with associated rank in internal medicine. Experienced in teaching, administration and medical practice. National Science Foundation grantee; 50 research publications, one book. Eastern location preferred. Address: A-515.

PHYSIOLOGIST: M.B.B.S. (Bombay, India), M.D.; age 34. Seven years teaching experience as lecturer in Bombay medical college. Present position, assistant professor of physiology. Seeking position in U.S. medical school, involving research with opportunity for earning Ph.D. degree in U.S.A. or Canada. Address: A-516.

ANATOMIST: M.B.B.S.; M.Sc. (Med.). Age 45. Thirteen years teaching experience in anatomy, Bombay medical college. Currently assistant professor of anatomy. Also experience in histology. Desires faculty position as professor or assistant professor of anatomy or histology or in a correlated preclinical teaching program. Address: A-517.

GENERAL SURGEON: With urological and gynecological training. American by birth, presently located in England. New York State license; trained in England and U.S. Holds the F.R.C.S., Eng., and Ch.M. Desires academic position in department of surgery, with opportunity for cancer research as well as routine surgery. Address: A-518.

SURGEON: Head and neck, and general plastic-reconstructive. Age 34; currently finishing two-year plastic surgery residency, with 3½ years otolaryngology and bronchoesophagology, and 3 years surgery (incl. 18 months in the head and neck surgery service) background. Desires one year assistantship, or fellowship, or preceptorship or academic position in either head-neck or plastic-reconstructive surgical fields or both beginning July 1, 1962. Address: A-519.

GENERAL SURGEON: Age 34, Board Certified. Now in full-time hospital position and faculty appointment. Desires new faculty position with private practice privileges or association in surgical group. Address: A-520.

ANESTHESIOLOGIST: Age 35, Board Certified, AOA. Currently associate professor, experienced in teaching, administration, research, and organizing new departments. Desires to plan, build and chair department of anesthesiology in new medical school, with opportunity to organize surgical-anesthesiological facilities and other portions of new teaching hospital. Southwestern or southern location preferred: Addrss: A-521.

ANATOMIST: Ph.D., age 36, married, family. Currently teaching at Eastern medical school. Six years teaching experience in all phases of medical school anatomy. Publications. Training in all basic medical sciences. Desires relocating with appointment in medical school or research institute. Address: A-522.

PHYSICAL BIOCHEMIST: Ph.D. 1951. Publications: physical chemistry of proteins; energetics, kinetics, and mechanism of enzymatic reactions. Protein interaction with ions and steroids. Isolation, chromatography, and identification of steroids. Osmometry, electrodialysis, and potentiometric studies of proteins. Desires career appointment at medical school or research institute. Address: A-523.

BIOCHEMIST-PHYSICIAN: Age 31, married. Ph.D. in 1955. Scheduled to receive M.D. in June, 1962. Experienced in medical school teaching and research. Several publications. Desires teaching and/or research position. Will consider related positions. Available June, 1962. Address: A-524.

BIOCHEMIST-PHYSIOLOGIST: Ph.D., age 40. Desires faculty appointment, teaching and research. At present research associate in hospital; assistant professor in department of biological chemistry. Teaching experience and publications. Research in intermediary metabolism. Salary open. Address: A-525.

GASTROENTEROLOGIST: Certified in internal medicine and also in gastroenterology. Desires position in university. Other major interests include hematology and peripheral vascular diseases. Trained at Mayo Clinic and in university. Experience includes clinical investigation, medical school faculty and private practice. Address: A-526.

INTERNIST: Certified. Age 35. Currently on faculty of Eastern medical school. Experience in private practice and administrative medicine. Desires appointment in teaching hospital and/or medical school with opportunities for clinical research in cardiovascular disease, teaching and administrative responsibilities. Address: A-527.

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1. The Composition of Milks, Publication 254, National Academy of Sciences and National Research Council, Revised 1953. 2. Brown, G. W.; Tuholski, J. M.; Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: J. Pediat. *56*:391 (Mar.) 1960.

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